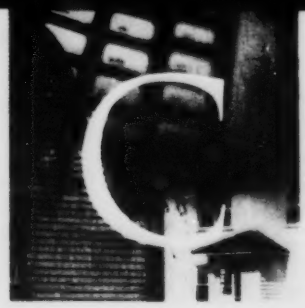
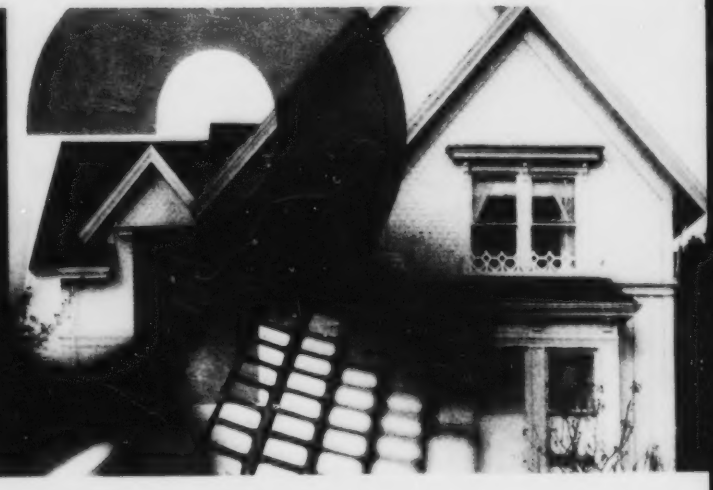


CURRENT HOUSING RESEARCH

Volume 7, No. 1

Spring 2000

SOCIAL, ECONOMIC AND TECHNICAL RESEARCH



CMHC SCHL

HOME TO CANADIANS

Canada

CURRENT HOUSING RESEARCH

Volume 7, No. 1
Spring, 2000

Issued also in French under the title: ***Recherches courantes sur l'habitation***

Publié aussi en français sous le titre: ***Recherches courantes sur l'habitation***

100-07328/

CURRENT HOUSING RESEARCH ORDER FORM

If you wish to receive any of the completed reports or bibliographies listed, or if you would like to be on the mailing list to receive *Current Housing Research*, please fill out this form and send it to:

Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa ON K1A 0P7
Fax (613) 748-4069
Telephone 1-800-668-2642
Email: chic@cmhc-schl.gc.ca

Completed Reports Requested

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☐ Send copies of above reports/bibliographies

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INTRODUCTION

Welcome to "*Current Housing Research*". This publication merges "*Housing Research Quarterly*" and "*Current Housing Technology Initiatives*" and continues the numbering of the "Housing Research Quarterly".

Under Part IX of the National Housing Act the Government of Canada provides funds to Canada Mortgage and Housing Corporation to conduct research into the social, economic and technical aspects of housing and related fields.

Current Housing Research is compiled and produced three times a year by the Canadian Housing Information Centre. This publication provides information and access to research which is undertaken and sponsored by the Corporation. It is also available on CMHC's Website at chic@cmhc-schl.gc.ca

The publication contains information on completed research reports, new publications, videos and bibliographies, as well as planned and ongoing research projects. An alphabetical title index of items listed is included at the end for quick reference.

The overall arrangement of "*Current Housing Research*" is by broad subject category. Within each subject category, lists of planned and ongoing projects and completed research reports are described.

Each entry can contain the following elements:

- The project or report title;
- A description of the project or report results;
- The CMHC Project Officer who is managing the project;
- The Division within CMHC which is responsible for the project;
- For External Research Projects, the grant recipient undertaking the research;
- A Contract Identification Number (CIDN);

- The Status of the project: whether the project is in a planned, ongoing or completed phase. "Planned Projects" are those that are not yet underway, but are likely to be initiated in the current year. "Ongoing Projects" refer to research projects which are currently underway. No reports are yet available. Once the project is completed, and a report is available for distribution, it will be listed as a "completed report."

- Whether the report resulting from the research project is available and the address where the completed report can be obtained.

To discuss research projects that are recent or ongoing, please call CMHC General Inquiries at (613) 748-2000 and ask for the CMHC Project Officer identified under each project description.

CMHC's External Research Program

The objective of the CMHC External Research Program (ERP) is to encourage and enable researchers in the private and not-for-profit sectors to put forward and carry out relevant, innovative, and high quality housing research projects. Under the Program, financial contributions are made to support research investigations into important questions, problems, and issues affecting Canadian housing. Housing research priority areas are identified in the "External Research Program Grants for Housing Research Guidelines and Application Form".

Applicants to the External Research Program must be Canadian citizens or have permanent resident status in Canada.

Independent researchers as well as those employed in Canadian universities, institutions, private consulting firms, the pr- essions and the housing industry may apply for these grants.

Full-time students at the graduate or undergraduate level are not eligible to apply. Students may be hired to assist in the conduct of the research, but under no circumstances may they take over responsibility for the direction of the work or the quality of the final report.

Individuals who are full-time federal, provincial or municipal government employees may apply. However, to be eligible, an applicant must provide a letter of support from her/his employer which shows that the proposed research is not part of, and will not interfere with, her/his regular work. CMHC employees are not eligible to receive grants under this Program.

CMHC is interested in receiving applications on topics related to its housing research priority areas. New ideas and innovative approaches in these areas are welcome.

To obtain the booklet outlining the priority research areas, the guidelines and application form for the External Research Program you may contact:

The Administrator
CMHC External Research Program
Research Division
Canada Mortgage and Housing Corporation
700 Montreal Road, Room C7-307
Ottawa, Ontario
K1A 0P7

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NOTE TO INTERNATIONAL CLIENTS

The *"Current Housing Research"* cites research reports and priced publications. **Availability and place of ordering varies with the type of report.**

PRICED PUBLICATIONS

Publications with prices listed in the *"Current Housing Research"* are available for sale to international clients. Prices are payable in Canadian dollars. Orders can be placed and the exact price, with shipping and handling, can be obtained from the following address:

CMHC Information Products
P.O. Box 35005
Stn BRM B
Toronto, Ontario
M7Y 6E5
Tel.: 613-748-2003
Fax: 613-748-2016

RESEARCH REPORTS

Research reports are listed without a price in the *"Current Housing Research"*. They are free to Canadian residents. However, to recover some of our distribution costs there is a fee to mail research reports to locations outside of Canada. The price for research reports mailed to destinations in the United States is $10.00 for each report. The price for research reports mailed to destinations in other countries is $15.00 for each report. Prices are payable in Canadian dollars. Research reports can be ordered from the address listed below:

Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367
Fax.: 613-748-4069
Internet: chic@cmhc-schl.gc.ca

TECHNICAL RESEARCH

ABORIGINAL HOUSING

EVALUATION OF THE HOUSING INTERNSHIP INITIATIVE FOR FIRST NATIONS AND INUIT YOUTH

The purpose of this project is to undertake an evaluation study of the housing Internship Initiative for First Nations and Inuit Youth administered by CMHC as part of the federal government Youth Employment Strategy.

CMHC Project Officer : *Denys Chamberland*
Division : B.C. & Yukon Business *Centre*
AVAILABILITY : Publication is not available

CIDN : 2082 0500001
STATUS : Ongoing Project

INFORMATION TRANSFER OF HEALTHY HOUSING (HH) TECHNOLOGY IN THE ABORIGINAL CONTEXT

This project will convene a symposium of First Nations teams which have, or plan to, undertake Healthy Housing demonstrations to share construction experiences, appropriateness of the technology chosen, and other issues, concerns, best practices, etc. To facilitate technology and information transfer broadly to other First Nations communities across Canada, a Best Practices / Lessons Learned (from the demonstrations) information product will be prepared and made available to illustrate options, solutions and innovations to address some critical health, safety, durability and affordability concerns of on-reserve First Nations housing.

CMHC Project Officer : *Alain Croteau*
Division : Assisted Housing Division
AVAILABILITY : Publication is not available

STATUS : Planned
**** NEW PROJECT ****

NATIVE TECHNICAL TRAINING - DEVELOPMENT OF TRAINING MODULES

The objective of this project is to provide a set of new and revised technical training materials to facilitate future CMHC and First Nations-sponsored builder training sessions. The preliminary training modules have been successfully piloted in First Nations communities in various parts of Canada. Additional materials related to alternative foundation systems are being finalized.

CMHC Project Officer : *Tom Kerwin*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1750 0300002
STATUS : Ongoing Project

ABORIGINAL HOUSING

PARTICIPATORY PLANNING PROCESSES WITHIN FIRST NATIONS COMMUNITIES

This project's purpose is to carry out the research project entitled "Participatory Planning Processes Within First Nations Communities".

CMHC Project Officer : *Raymond W Bursey*
CIDN : 2144 0200012
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

** **SEE ALSO: Indoor Air Quality Training in First Nations Communities, p. 91**
Demonstration of Healthy Housing on Reserve, p. 113

ACOUSTICS

IMPACT DU BRUIT INDUSTRIEL SUR LES SECTEURS RÉSIDENTIELS ENVIRONNANTS: PORTRAIT DE LA SITUATION POUR LA BEAUCE ET POUR LA RÉGION DE QUÉBEC, ANALYSE DES LOCALISATIONS PROBLÉMATIQUES ET RECOMMANDATIONS

Residential sectors can be adjacent to sectors that are classified as commercial or industrial but, in many cases, the two functions are not compatible, whether on account of intense trucking activity, sporadic noise throughout the day or even continuous noise that can last well into the night. There are many complaints in this regard, in both urban and rural areas. Planners and legislators are generally powerless to resolve this issue. In existing conflict situations, both functions are well within their rights, that is, residents can demand peace and tranquillity, while industrialists can expect to work and operate their companies, without having any new constraints imposed on them. As for potential situations, in the case of new residential developments, for example, there is not always an in-depth environmental analysis, or else, the pressure from developers wins out over the viewpoints of planners and environmentalists.

In this context, the research project proposed to establish the situation regarding the impact of industrial noise using as its laboratory the Québec and Beauce areas, two areas that comprise numerous industrial parks adjacent to residential sectors. The Beauce area, in addition to its very active industries, has a topography that is conducive to the concentration of urbanization and human activities. The principal objectives of the project were as follows:

- *establish the scope of the problem of the impact of industrial noise on the closest residential sectors;*
- *measure and map the noise in the residential sectors deemed the most critical (with special consideration given to industries operating 24 hours a day);*
- *verify the causes of the situations analyzed (uncontrolled growth of residential developments, poor industrial planning or indifference of the industrial sector);*
- *identify the provincial and municipal legislative situation;*

- *analyze the possible mitigating actions (in particular, using computer modelling), such as reducing or controlling the level of noise at the source, or introducing protective measures, which could potentially include landscaping; and, finally,*
- *compile the results in a regional perspective, for both the survey of the situation and the recommendations.*

Among all the industrial zones and parks visited, 15 sites were retained and analyzed in the Beauce area and 27 in the greater Québec area. The research project made it possible to document and clarify an often neglected aspect of residential environment quality and also to propose a few avenues for more sustainable solutions, to the attention of planners, industrialists, municipalities, and even developers.

Prepared by Jean-Gabriel Migneron, Pierre Côté, Wu Weixion. CMHC Project Officer: Sandra Marshall. Ottawa: Canada Mortgage and Housing Corporation, 1998. (External Research Program)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre

Canada Mortgage and Housing Corporation

700 Montreal Road

Ottawa, Ontario

K1A 0P7

Tel.: 613-748-2367 or 1-800-668-2642

Fax.: 613-748-4069

Email: chic@cmhc-schl.gc.ca

International clients see page 9 for order instructions.

RÉDUCTION DU BRUIT PRODUIT PAR LES PORTES DE GARAGES

This study concerns the noise transmitted into multiple housing project living quarters located above the garage entrance at the time of opening and closing the doors installed at this entrance. The report presents the levels of noise transmitted to the living quarters during the operation of the 15 garage doors tested and the installation conditions of each door (wood or concrete construction, mechanically or manually operated door, jamb and mechanism cushioned or not, etc.), as well as ways to reduce the noise transmitted by 7 to 13 dB depending on the installation conditions.

Prepared by Michel Morin, MJB Conseillers en Acoustique inc. CMHC Project Officer: Sandra Marshall. Ottawa: Canada Mortgage and Housing Corporation, 1994 (i.e. 1999) (External Research Program)

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

SOUND AND FIRE PERFORMANCE OF FIRE STOPS IN MULTI-FAMILY DWELLINGS: FLANKING TRANSMISSION AT JOINTS IN MULTI-FAMILY DWELLINGS: PHASE I: TRANSMISSION VIA FIRE STOPS

Fire stops can introduce a physical connection between the two sides of a double-stud wall, hence providing structural flanking paths for transmission of vibration which worsens the sound insulation.

This study primarily addressed the specific case of a load-bearing party wall with double wood studs, supporting a floor with wood joists perpendicular to the party wall and a floor deck or sub-floor of 15.9 mm OSB.

Even without structural transmission of vibration through a fire stop, the sound insulation in a real building is normally affected by flanking transmission.

Addition of a fire stop provides yet another path for vibration transmission between the rooms, and hence tends to worsen the sound insulation further. This study examines how a fire stop at the floor/wall junction can degrade the apparent sound insulation of the party wall (the nominal separation) by increasing structural transmission of vibration around that wall via the connected floor system (the flanking path).

Prepared by T.R.T. Nightingale, R.E. Halliwell, Institute for Research in Construction, National Research Council. Prepared for: Canada Mortgage and Housing Corporation ... et al. CMHC Project Officer: Jacques Rousseau. Ottawa: CMHC, 1997.

STATUS : Completed Report

ACOUSTICS

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

BASEMENTS, FOUNDATIONS & CRAWLSPACES

BASEMENT WALLS THAT DRY: FINAL PROJECT REPORT

An eighteen month study was undertaken to evaluate the abilities of 10 basement wall insulation/framing options to dry after being subjected to either a controlled leak or a short term flood. Conventional wood framed construction, steel stud construction and three proprietary systems were evaluated. The proprietary systems included a new product from Owens Corning which is a vinyl faced rigid fibreglass system which can be installed without wood or steel framing, an extruded polystyrene insulation system, Perimate from Dow and a sprayed in place polyurethane insulation. Five variations of conventional wood stud framing were evaluated. The differences evaluated ranged from the use of an external moisture barrier to standing the framing off walls and floors to the use of Densglas as an alternative to gypsum board. The two steel stud systems tested varied only in stand off from the basement wall.

In general all of the proprietary wall systems performed better that the wood framed or steel stud systems. The systems either did not absorb significant amounts of moisture or dried relatively rapidly after wetting. This was observed whether the moisture source was a controlled leak or a short term flood.

The steel stud stystems performed better than their wood framed counterparts when subjected to a short term flood. The steel studs, having no capability to retain moisture, dried out more quickly than the wood systems.

Of the wood framed systems tested none appeared superior in both cases; controlled leak or flood. In the case of a controlled leak, such as might occur in the event of a crack in a basement wall, the systems that had an external moisture barrier caused the water to flow down the wall, under the bottom plate and into the basement. Because such system systems were never really wetted they appeared to offer superior performance. When the source of the moisture was a flood the opposite appeared to be true. It was not possible to "seal" the panels, nor was any real attempt made to do so. When standing in 100 mm of water during a "flood" the liquid found its way into all panels, regardless of whether a moisture barrier was present. Once in the panel the moisture remained longer in panels equipped with a moisture barrier. In other words the moisture barrier inhibited moisture removal.

Aside from some darkening in the bottom plate of two of the wood framed panels the study was unsuccessful in producing significant growth of mold or mildew. Conditions were generally favourable; surface moisture and wood moisture contents in excess of 25% for months but no infestations occurred. This may be due to the lack of spores which must be present to initiate growth.

Prepared by Tom W. Forest and Mark Y. Ackerman. Ottawa: Canada Mortgage and Housing Corporation, 1999.

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

IMPROVED BASEMENT PERFORMANCE

Concerns have been expressed by a number of authorities about the quality of construction of new basements. Technical and cost issues pertaining to the overall performance of poured-in-place concrete basements will be examined. The Canadian Standards Association (CSA), with CMHC and industry support, will improve the standard CAN3-A438-M84: Concrete Construction for Housing and Small Buildings. This standard addresses requirements for poured-in-place concrete basements. Several task groups are working to update this standard.

CMHC Project Officer : *Don Fugler*

CIDN : 1259 0200001

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

PERFORMANCE GUIDELINE DEVELOPMENT FOR BASEMENT SYSTEMS AND MATERIALS

CMHC is a participant contributing research to this multi-disciplinary, multi-agency study led by the National Research Council identifying knowledge gaps in the performance of basement systems. Guidelines are being developed for design, construction and evaluation of basement materials and systems to ensure their durability and long-term performance. Field work is complete. Guidelines should be drafted in the winter of 1999/2000.

BASEMENTS, FOUNDATIONS & CRAWLSPACES

CMHC Project Officer : *Don Fugler*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1421 0200001
STATUS : Ongoing Project

SLIDE PRESENTATIONS ON TWO FOUNDATION TYPES AND TO MONITOR THE PERFORMANCE OF THE EXAMPLES OF THE TWO FOUNDATION SYSTEMS

The purpose of this project is to undertake and complete the development of two slide presentations and the monitoring of two foundations over a one-year period. The slide presentations will be integrated into the First Nations builder training curriculum materials.

CMHC Project Officer : *Tom Kerwin*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1813 030000
STATUS : Ongoing Project

** SEE ALSO:
- The Effectiveness of Various Basement Treatments and Renovations to Solve Identified Basement Moisture Problems, p. 97
- Earthquake Resistant Modular Home Foundation Systems, p. 166
- Foundation Systems for Use in Permafrost Areas, p. 102
- Innovative Foundation Heating and Ventilation, p. 103

BUILDING CODES

AUSTRALIAN BUILDING REGULATORY REFORMS

To conduct further research into Australian building regulation and liability reforms by documenting the Australian experience with the reforms to date, examining the issues encountered with respect to the application of the reforms to the housing sector. The Commonwealth Government of Australia and individual Australian states have introduced reforms to the regulatory environment in order to reduce costs and barriers associated with development and construction. Some of the reforms include a transition to objective based building codes, the introduction of compulsory job-specific warranty-type insurance programs, limitations on liability for building practitioners, privatization of building approvals and inspections and compulsory registration of building professionals. This project documents the reforms implemented in the State of Victoria based on a review of documentation and regulations and interviews with key actors. The status of similar reforms in other states and territories is reported. A draft report has been received and is being reviewed for publication in the spring of 2000.

CMHC Project Officer : *Brian Eames*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2185 0200001
STATUS : Ongoing Project

BUILDING CODES

FUTURE OF CANADIAN STANDARDS FOR RESIDENTIAL CONSTRUCTION

The objective of this project is to build on the March/97 report of the Joint Task Force of the Canadian Commission on Building and Fire Codes/Provincial/Territorial Committee on Building Standards (PTCBS/CCBFC) by documenting recent changes in standards specifically related to the housing industry, describe the role and importance of standards in the housing industry and examine the issues and implications for various futures of each category of the standards.

CMHC Project Officer : *Doug Pollard*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2027 0200001
STATUS : Ongoing Project

RECOGNITION OF SECONDARY SUITES IN THE NATIONAL BUILDING CODE

Secondary (or accessory) suites represent an affordable housing option that has received growing attention from provinces and municipalities in recent years. The National Building Code (NBC) currently views them as duplexes or semidetached units. Some Canadian provinces have changed their Building Codes to allow more lenient requirements for secondary suites, particularly in older houses. This study is examining legislation governing secondary suites in several jurisdictions leading to the preparation of a discussion piece on possible changes to the NBC for the recognition of this housing form in the Code.

CMHC Project Officer : *Brian Eames*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2233 0200001
STATUS : Ongoing Project
**** NEW ****

ROLE OF CONSTRUCTION CODES IN THE CANADIAN BUILDING SYSTEM

The purpose of this joint venture project with NRC and CHBA is to develop two papers which will help in the understanding of the changes to the Model National Codes which are occurring as a result of efforts currently underway to clarify the objectives of these codes and move them to being Objective-Based. The first paper is entitled "Canada's Construction System and the Context for Model Codes". It presents an overview of the system of construction in Canada and the role of Model Codes in that system. The second paper will describe the value and benefits of Objective-Based Codes to residential builders and renovators.

CMHC Project Officer : *Brian Eames*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2248 0200001
STATUS : Ongoing Project
**** NEW ****

BUILDING MATERIALS

ADJUST-A-FORM

The objective of this project is to develop ideas for adjustable, reusable concrete forms. Specifically the project spans the inception through to the development of a specific product ready for marketing. The end result will be a product that saves builders time and material and therefore project costs.

CMHC Project Officer : *Darrel Smith*
CIDN : 1501 0200001
Division : Research Division
Housing Technology Incentives Program
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

BUILDING AND RENOVATING WITH SALVAGED MATERIALS: A REUSE WORKPLAN

The objective of this External Research project is to develop and test design procedures and specification guidelines in the form of a workplan by which design professionals and builders can effectively salvage and reuse materials in building projects including demolition and renovation or new construction at a residential scale.

CMHC Project Officer : *Darrel Smith*
CIDN : 2023 0200001
Division : External Research Program
Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

COMPRESSED EARTH BLOCK CONSTRUCTION

The objective of this project is to officially approve the material "earth", to allow architects, builders and self-builders to make use of earth construction.

CMHC Project Officer : *Chris Ives*
CIDN : 2004 0200001
Division : External Research Program
Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

BUILDING MATERIALS

DURABILITY AND SERVICE LIFE OF MULTI-UNIT RESIDENTIAL BUILDING ELEMENTS AND EQUIPMENT

A Delphi study is currently underway to collect information from property managers, property management firms and experts in differing fields to determine, from their experience, the service life of building elements such as HVAC systems, elevators, walls, parking garages, etc. The study is expected to provide data on building elements which in some cases would have low or high service life variances. Follow-up research could then be undertaken to investigate why those building elements have these high variances.

CMHC Project Officer : *Ken Ruest*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN : 1915 0200002

STATUS : Ongoing Project

MACROECONOMIC IMPACT OF THE BUILDING MATERIALS INDUSTRY IN CANADA

Using input-output (I-O) data and a well-known macroeconomics model of the Canadian economy, this study estimates the economic impact of the Canadian building materials industry in terms of national income and employment for the years 1995 and 1989. The study covers sub-industries producing:

- *gypsum, wallboard and accessories;*
- *plumbing fixtures and fittings;*
- *windows and doors;*
- *roofing;*
- *insulation and air barriers;*
- *heating and air conditioning systems;*
- *exterior cladding;*
- *flooring;*
- *concrete products;*
- *ready-to-use lumber;*
- *paints and related products;*
- *textile floor coverings;*
- *kitchen cabinets; and*
- *floor and wall coverings, excluding vinyl.*

For each sub-industry, impacts are broken down into:

- *direct impacts, occurring within the sub-industry itself;*
- *indirect impacts, occurring in industries that supply the sub-industry with raw materials and other inputs; and*
- *induced impacts, generated throughout the economy as households spend income earned as a result of direct and indirect impacts.*

Prepared by Geoff Bromfield, Martha Justus, Keith May, Informetrica Limited. Ottawa: Canada Mortgage and Housing Corporation, 1999. (Housing Affordability and Finance Series: Research Report)

*Order number: PE0325 **Price: $12.95 + GST and handling charges.*

STATUS : Completed Report

AVAILABILITY : CMHC Information Products
P.O. Box 35005
Stn BRM B
Toronto, Ontario M7Y 6E5
1-800-668-2642
Fax orders from Canada: 1-800-245-9274
International clients see page 9 for order instructions.

PERFORMANCE OF PLASTIC AND COMPOSITE MASONRY TIES

The objective of this project is to investigate the possibility of using alternative materials (plastics or composites) in the fabrication of masonry ties. Detailed research will be undertaken to determine what has been done in the field of masonry ties around the world. The information received will be reviewed with respect to the appropriateness of plastic or composite masonry ties for masonry construction and the opportunities they represent.

CMHC Project Officer : *Luis de Miguel*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2144 0200020
STATUS : Ongoing Project

BUILDING MATERIALS

RE-USE: INTEGRATION OF USED BUILDING MATERIALS INTO NEW CONSTRUCTION

The objective of this External Research Program project is to promote the practice of re-use of building materials as a viable approach in the 3Rs of sound environmental practice for the construction industry, presently including waste management through recycling and reduction. Research will address 4 main concerns: economic, environmental, legislative/practical and perceptual -- presently barriers to viability in practice.

CMHC Project Officer : *Darrel Smith*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 1842 0200001
STATUS : Ongoing Project

CONCRETE

BEST PRACTICE GUIDE FOR PRE-CAST CONCRETE WALLS

In partnership with the Canadian Precast and Prestressed Concrete Institute and Public Works Government Services Canada, this project will develop a practical, advisory document related to pre-cast concrete wall systems in housing applications. The Guide, produced in hard copy and CD-ROM format, will address: pertinent building science with emphasis given to aspects particular to pre-cast concrete panels, construction details in AutoCAD format, additional sources of information and references. The Guide will help pre-cast manufacturers and installers better explain the capabilities of this wall system to owners and designers and help architects and engineers to produce more reliable construction details. The anticipated release date for the product is May 2000.

CMHC Project Officer : *Luis de Miguel*
Division : Research Division
AVAILABILITY : Publication is not available

STATUS : Planned
**** NEW PROJECT ****

CONCRETE

BEST PRACTICE GUIDE FOR THE EVALUATION, REPAIR AND MAINTENANCE OF PARKING GARAGES

The objective of this project, a partnership between CMHC and PWGSC, is to develop an advisory document providing guidance for the appropriate evaluation, repair, protection, maintenance and monitoring of concrete parking structures.

Billions of dollars are spent annually to repair and maintain concrete structures. Parking garages are subjected to demanding service conditions; not only vehicular loading but also thermal and moisture loads. In addition, the growing trend toward the use of de-icing salts on our roads by municipalities will ensure the need for future concrete repairs and replacement despite a variety of protective measures to delay the deterioration process. Frequent and often unexpected repairs to these structures place enormous financial burdens on the building owners and property managers.

The principle output from this project will be the production of a detailed technical document aimed specifically towards engineers and technologists involved in the evaluation, maintenance and repair of parking structures.

CMHC Project Officer : *Silvio Plescia*
Division : Research Division
AVAILABILITY : Publication is not available

STATUS : Planned
**** NEW PROJECT ****

DEVELOPMENT OF A NEW EDITION OF THE STANDARD FOR CONCRETE CONSTRUCTION FOR HOUSING AND SMALL BUILDINGS (CSA A438)

The purpose of this project is: - to carry out a review of the literature pertaining to current failures of concrete in residential basements, specifically addressing the high incidence of foundation wall cracking and water penetration.- to determine how the delivered ready-mix might be improved in crack-resistance and how on-site concreting practices might be remedied; and- to bring standard A438 into line with the requirements of the 1994 edition of CSA 23.1 Standard Concrete Materials and Construction.The Canadian Standards Association (CSA), with CMHC and industry support, has redrafted the standard CAN3-A438-M84: Concrete Construction for Housing and Small Buildings. This standard addresses requirements for poured-in-place concrete basements. CSA is preparing the publication.

CMHC Project Officer : *Don Fugler*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1259 0200001
STATUS : Ongoing Project

CONCRETE

INVESTIGATION AND REPAIR STRATEGIES FOR CONCRETE CONSTRUCTION AND CATALOGUE OF INNOVATIVE CONCRETE ASSESSMENT AND REPAIR TECHNOLOGIES

The purpose of this project is to create a survey questionnaire on concrete assessment, repair and monitoring strategies and report on existing protocols regarding concrete problems in multi-unit residential buildings.

CMHC Project Officer : *Silvio Plescia*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1890 0200002
STATUS : Ongoing Project

STANDARDIZATION OF CONCRETE REPAIR PROTOCOLS

This project will research current assessment, monitoring and repair strategies for concrete repair. Existing protocols commonly used in the field as well as existing protocol guidelines assembled by various agencies (eg. CSA) will be catalogued. This research will provide consultants, contractors and building owners with available protocols and concrete repair strategies.

CMHC Project Officer : *Silvio Plescia*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1890 0200002
STATUS : Ongoing Project

CONSUMER PROTECTION

ISSUES PAPER ON LIABILITY IN HOUSE CONSTRUCTION

The Canadian Home Builders Association (CHBA) has expressed a concern that, in housing construction, it is becoming less clear who is liable for specific aspects relating to the house. They also are concerned that, as a result of cutbacks, municipalities are not carrying out inspections to the extent they once did and may be losing the capacity to properly enforce building regulations. This joint project, co-funded by CMHC and CHBA and managed by CHBA, will produce a paper discussing the issue of liability in housing construction across Canada and identify who is and is not liable. It will serve as the basis for discussion on these issues and for further study. The National Research Council (NRC) will also be a participating partner as the agency responsible for code development. An initial draft was prepared and the project was extended to include provincial consultations at CHBA's request.

CMHC Project Officer : *Brian Eames*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1920 0200001
STATUS : Ongoing Project

CONSUMER PROTECTION

OVERVIEW OF CONSUMER PROTECTION FOR HOUSING IN CANADA

For most Canadians buying a house is the largest financial expenditure they are ever likely to make. On an ongoing basis, housing represents a major component of household expenditures whether for mortgage or rent payment, maintenance and repairs or renovations and improvements. Canadian consumers have increasingly expressed concerns about dealing with the home building and renovation industry. These concerns have contributed to low consumer confidence in the housing industry, as measured by various public opinion research. Builders and contractors have also expressed concerns regarding issues of liability with respect to housing construction deficiencies and operating problems. New home warranty programs exist to provide some protection for purchasers of new housing but vary in terms of time limits, eligible components and financial limitations. This study will provide an overview of the context and issues surrounding consumer protection for housing in Canada. Information will be collected to produce an inventory of available programs, initiatives and activities addressing consumer protection including warranty programs, inspection services, consumer information products, training activities, etc.

CMHC Project Officer : *Brian Eames* — ***CIDN*** : 2135 0200001

Division : Research Division — ***STATUS*** : Ongoing Project

AVAILABILITY : Publication is not available

PREPARATION OF ABOUT YOUR HOUSE DOCUMENTS

CMHC's About Your House series provides consumers with concise information on a variety of popular housing topics. These information products are available from CMHC's web-site and are designed to be readily photocopied. In the fall of 1999, five new topics were added to the several dozen existing ones. The new topics are: How to read an MSDS sheet; Home insulation; Kitchen and bathroom fans; Log houses; Carbon monoxide sensors. All have been submitted for publication and should be available early in 2000.

CMHC Project Officer : *Don Fugler* — ***CIDN*** : 1584 0300002

Division : Research Division — ***STATUS*** : Ongoing Project

AVAILABILITY : Publication is not available — **** NEW ***

CONTAMINATED LANDS

DEMONSTRATION OF SAFE HOUSING ON LIGHTLY CONTAMINATED LANDS

CMHC research into contaminated lands shows that some types of soil contaminants could be rendered innocuous through building design and operation. One example is heavy metals deep within the soil. If these pollutants can be avoided through design, the cost of land remediation could be greatly reduced. The project will include contaminant monitoring and the investigation of the predictive capabilities of site specific risk assessments.

CMHC Project Officer : *Don Fugler*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1946 0200001
STATUS : Ongoing Project

EVALUATION OF SITE SPECIFIC RISK ASSESSMENTS FOR HOUSES

The objective of this project was to assess the accuracy, reproducibility, and utility of site specific risk assessments for houses. A description of a hypothetical contaminated site was submitted to nine risk assessment consultants and they provided "screening level" assessments on the health risks experienced by residents of houses built on that site. The risk assessments varied widely, by several orders of magnitude. A research report has been issued on the work. It discusses how the consultants differed in their risk assessments, the source of the assessment variation, and how the assessments could be improved.

The final task is for the contractor to submit an article on project findings to a peer-reviewed journal on risk assessment.

CMHC Project Officer : *Don Fugler*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1534 0200002
STATUS : Ongoing Project

DOORS AND WINDOWS

CONCEPTION DE JOINTS DURABLES ENTRE LES FENÊTRES ET LES MURS

This study aimed at finding ways of designing wall/windows joints with increased durability. It took into consideration environmental factors contributing to the deterioration of the joints, different materials incorporated in the window structure, various types of structures, building envelopes, and exterior siding, and different materials which can be used in the joints themselves. The research project included development of construction details, theoretical assessment of the performance of different solution details, definition of test procedures, and laboratory tests on a typical detail. A methodology for designing the joints is included in the report.

DOORS AND WINDOWS

Prepared by Air-Ins Inc. and Groupe Petrone. CMHC Project Officer: Jacques Rousseau. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
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INFLUENCE OF AIR INFILTRATION ON THE ENERGY EFFICIENCY OF RESIDENTIAL WINDOWS

The current Canadian window energy rating system takes into account the solar gains, conductive heat losses and infiltration heat losses in the assessment of the energy performance of windows. The assumptions used for the infiltration heat loss calculations have been questioned by some researchers. The objective of this project is to propose a new way of accounting for air infiltration in energy efficiency calculations for windows.

CMHC Project Officer : *Ken Ruest*

Division : External Research Program
Research Division

AVAILABILITY : Publication is not available

CIDN : 2002 0200001

STATUS : Ongoing Project

ENERGY CONSERVATION

ALTERNATIVE HOME ENERGY SOURCES FOR THE NORTH

This project will research and compile information and literature on known alternative home energy sources considered appropriate for residential use in Canada's North. These systems, technologies and products would be evaluated and actual experiences presented. An analysis of the cost-benefit of alternate energy will be included and referenced to a recently completed study of utility costs in Northern locales. The result will be a Best Practices Manual for Residential Alternate Energy in the North.

ENERGY CONSERVATION

CMHC Project Officer : *Aleta Fowler*
Division : Research Division
AVAILABILITY : Publication is not available

STATUS : Planned
**** NEW PROJECT ****

ANALYSIS OF THE IMPACT OF ENERGY EFFICIENCY MEASURES IN MULTI-UNIT RESIDENTIAL BUILDINGS

An energy and greenhouse gas emission simulator will be developed to model the impacts of energy efficiency measures on large buildings. The energy simulator will be capable of analyzing the impact of individual, or packages of, energy efficiency measures on the energy consumption and green house gas emissions of large commercial and multi-unit residential buildings. Regional and national energy and green house gas emission reductions will be assessed by using the simulator to evaluate the impact of energy efficiency measures on the buildings in a representative building database. The results of the analysis will then be projected to national levels to determine the extent of retrofit measures that are required within the building stock to meet the reduction targets set by the Kyoto Protocol in December 1997.

CMHC Project Officer : *Duncan Hill*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2249 0200001
STATUS : Ongoing Project
**** NEW ****

BUILDING ENERGY ESTIMATION METHOD BASED ON ARTIFICIAL INTELLIGENCE

The objective of this project is to establish a rapid building energy estimation method based on fuzzy logic and neural networks. The energy simulator will allow the use of simplified building characteristics and utility invoice information, if available, to determine the annual energy use of buildings. The simulator will allow designers to estimate the performance of buildings at the design stage and to assess the cost-benefits of energy efficiency measures.

CMHC Project Officer : *Sandra Marshall*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 1841 0200001
STATUS : Ongoing Project
**** NEW ****

CORRIDOR AIR VENTILATION SYSTEM ENERGY USE IN MULTI-UNIT RESIDENTIAL BUILDINGS

Canada Mortgage and Housing Corporation (CMHC) funded this study to expand knowledge about the energy impact of operating ventilation systems that pressurize corridors in multi-unit residential buildings (MURBs). In the winter of 1997/98, a field test protocol to assess the impact of corridor ventilation system operation was developed and tested on a MURB. Building energy use was monitored with the corridor ventilation system operating one winter night and off the following night. This process was repeated over a range of temperatures. The tests provided real data on the energy impact of operating corridor ventilation systems. Monitoring data were compared with predictions from a computer model. The computer model proved not to be a useful tool for assessing the impacts of corridor ventilation on infiltration or building energy use. In the winter of 1998/99, the field protocol was tested on another four buildings to assess its applicability to buildings with different energy systems.

Data analysis focused on time periods between midnight and early morning, when the impacts of solar gains and day-to-day variation in DHW loads and occupant activities (cooking, cleaning, clothes drying, weekends, holidays, etc.) were assumed to be minimized. Linear regression was applied to each data set (i.e., the fans-on data and the fans-off data) to mathematically define the relationships between outdoor temperature and energy use in each building.

The field protocol was relatively straightforward and inexpensive to apply and could be done without use of expensive or high-tech monitoring equipment. The data analyses, done in a spreadsheet computer program, showed very good correlation between outdoor temperature and whole-building energy use and distinct relationships for the "fan on" and "fan off" operating condition. Observations made on the five study buildings were sufficiently similar to allow for general conclusions to be drawn about the impact of operating corridor ventilation systems on building energy use and whole-building air change rates.

The observed increase in whole building energy use when the corridor ventilation systems were operated in the study buildings ranged from 60 to 90% of energy that would be required to condition the corridor ventilation system air flow. This energy increase was much bigger than expected, based on a fundamental analysis of the buildings. This leads to the conclusion that operating corridor ventilation systems does not appreciably increase indoor-to-outdoor pressure differentials across suite walls so does not displace significant amounts of infiltration.

Turning the corridor ventilation system off did not result in complaints about air quality during cold weather, but did when temperatures were above freezing. As such, turning corridor ventilation systems off may be an effective strategy for reducing energy consumption and peak energy demand during very cold weather.

Prepared by Bert Phillips, Unies Ltd. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Duncan Hill. Ottawa: CMHC, 1999.

ENERGY CONSERVATION

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
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DOCUMENTATION OF ENERGY EFFICIENCY CASE STUDIES: 1055 BAY STREET, TORONTO

CMHC is in the process of documenting, as case studies, buildings that have been upgraded with respect to energy efficiency. The owners of the high-rise residential building at 1055 Bay Street recently initiated a number of energy efficiency measures that reduced the annual energy consumption of the building.. CMHC is conducting a detailed energy audit to assess the cost-benefit of each energy measure implemented in the case study building, both individually and as a complete package. The energy efficiency measures implemented and the energy consumption characteristics of the building before and after the upgrade will be documented as an energy efficiency case study.

CMHC Project Officer : *Duncan Hill*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1899 0200005
STATUS : Ongoing Project
**** NEW ****

ENERGY EFFICIENCY CASE STUDIES OF MULTI-UNIT RESIDENTIAL BUILDINGS

CMHC is in the process of documenting the application of energy efficiency measures in multi-unit residential buildings to be used as case studies. A trial case study of a housing co-operative in Ottawa is underway, to not only assess the strengths and weaknesses of the energy efficiency measures implemented, but also to identify what information can be disseminated to others in the building industry. Upon completion of this first case study, CMHC will be soliciting the housing industry for additional energy efficiency case studies. A compendium of case studies will be made available from CMHC. The case studies will also support the Energy Efficiency Opportunities Manual for Multi-Unit Residential Buildings that CMHC is in the process of developing.

CMHC Project Officer : *Duncan Hill*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1899 0200002-3
STATUS : Ongoing Project

ENERGY CONSERVATION

ENERGY EFFICIENCY CASE STUDIES: MONITORING A DUEL HEATING SYSTEM INSTALLATION

This research will monitor and assess the performance of a dual fuel heating system in an 89 suite apartment building. Originally, the building was heated with electric baseboards. The presence of natural gas fired boilers allowed the installation of hydronic radiant panel within apartments to shift the heating load from electricity to natural gas. Following the installation of the system, the energy consumption of the building was tracked for a one-year period. A report will be issued that describes the system and its potential to reduce energy costs.

CMHC Project Officer : *Duncan Hill*
Division : Research Division
AVAILABILITY : Publication is not available

STATUS : Ongoing Project
**** NEW ****

ENERGY EFFICIENCY OPPORTUNITIES MANUAL FOR MULTI-UNIT RESIDENTIAL BUILDINGS

CMHC, in partnership with the Ontario Ministry of Municipal Affairs and Housing (OMMAH), is in the process of developing a manual that details energy efficiency measures for existing multi-unit residential buildings. The document will be based on one originally developed by the Ontario Ministry of Housing in the early 1980's. The new manual will offer proven, current energy efficiency measures for the building envelope, mechanical, electrical, and domestic hot water heating systems. A project steering committee consisting of members of the housing, utilities and government agencies has been formed to provide comment on the manual as it is developed. The manual will be modularized and provided in a format that will be easily updated over time.

CMHC Project Officer : *Duncan Hill*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1887 0200002
STATUS : Ongoing Project

EVALUATION OF EMBODIED ENERGY FOR THE CONSERVATION CO-OPERATIVE

The objective of this project is to complete the evaluation of embodied energy for the Conservation Co-operative case study documentation.

CMHC Project Officer : *Sandra Marshall*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1817 0300002
STATUS : Ongoing Project

ENERGY CONSERVATION

FOUNDATION PAPER ON COMMUNITY ENERGY PLANNING

Following the recent Kyoto summit on climate change, the federal government recently established fifteen "Issue/Sector Tables" to examine the costs and impacts of implementing Canada's greenhouse gas reduction targets. CMHC is a member of the "Municipalities Table" and co-chairs the subcommittee on "Community Energy Planning" (reporting to the Municipalities Table). CMHC recently funded the development of a Foundation Paper on Community Energy Planning to examine the potential energy savings and greenhouse gas emission reductions associated with integrated transportation and land-use planning, community energy systems (cogeneration, district heating, etc.), and other energy management options.

CMHC Project Officer : *Brian Eames*

CIDN : 2078 0200001

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

IMPACT OF ADDED INSULATION ON AIR LEAKAGE PATTERNS

The objectives of this project were: 1. To test a method of characterizing air exfiltration, experimentally and analytically. 2. To determine the impact of two insulation strategies - from inside and from outside - on the dispersal of exfiltrating air through various types of joints.

Adding insulation to exterior walls may worsen the original wall performance. Depending on the amount and geometry of air leakage in the original wall, added insulation may actually increase the potential for condensation, letting water accumulate in the wood structure and leading to rot.

An experiment was set up to compare the performance of different leaky walls and to investigate their behaviour with insulation added on one side or other of the wood studs. The experiment also maps the path of air leakage. The test conditions represented winter and late spring weather in Montreal.

It was found that the first measure to be considered remains the sealing and air tightening of the existing walls, with special care given to junctions and to punctures. If not sealed, leaky walls were found to accumulate moisture, especially when insulated on the outside.

Research Team: Dominique Derome, Paul Fazio, Guylaine Desmarais. CMHC Project Officer: Sandra Marshall. Ottawa: Canada Mortgage and Housing Corporation, 2000 (External Research Program)

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
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Fax.: 613-748-4069
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INTERNATIONAL ENERGY AGENCY (IEA) : ENERGY RELATED ENVIRONMENTAL IMPACT OF BUILDINGS

This four year project, scheduled to end in 2000, is an IEA activity in which 14 countries are collaborating in the development of life-cycle energy modelling and environmental impact analysis for buildings. Information will be compiled and published on the methodology and life-cycle environmental impact data. Examples will be developed of how methods may be applied to different building types and sources of expertise, with the potential for extending the influence of the task directly into academia. CMHC is acting as the Operating Agency for this project.

CMHC Project Officer : *Thomas Green*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1629 0200002
STATUS : Ongoing Project

LABORATORY TESTING OF DENSE PACK CELLULOSE FOR ATTIC INSULATION

Some insulators claim that dense packing of cellulose insulation into hard to reach cavities (e.g. flat roof attics) prevents air movement along with providing insulation. Hydro Québec looked at the technique for upgrading attic insulation of flat roof housing, largely in Montreal. CMHC and the Société d'habitation du Québec (SHQ) also contributed funds to this project. The field work is complete. CMHC is discussing with Hydro Québec ways of publishing the report or a condensation of its findings.

CMHC Project Officer : *Don Fugler*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1377 02010001
STATUS : Ongoing Project

MÉTHODE D'ESTIMATION ÉNERGÉTIQUE DES BÂTIMENTS D'HABITATION BASÉE SUR L'APPLICATION DE L'INTELLIGENCE ARTIFICIELLE

The objective of this project was to develop a rapid method of estimating energy use in highrise residential buildings, by the application of artificial intelligence. The method gives a variety of results, such as total energy consumption, power load, heat and cooling consumption, and takes into consideration such variables as apartment orientation, occupancy schedules, and the interaction of HVAC and envelope systems.

The work consisted of:

- Creation of data bases which classify the parameters of the energy simulations, modeling and validation of the results using DOE-2;
- Application of neural networks including training and validation of the results;
- Development of the simulation for residential buildings; and
- Validation of the simulation program.

The program at this stage has been developed for climatic conditions similar to Ottawa, which will be expanded at a later stage. It was tested to verify its accuracy using a previously monitored Ottawa highrise. It provides the total building energy consumption as well as the use by apartments, corridors and parking, with the power loads. The data entry and results interfaces can be modified as well. The program was developed using the MatLab environment: for a larger application, the program would need to be translated into C++ language.

Prepared by Stanislaw Kajl and Marc-Antoine Roberge. CMHC Project Manager: Sandra Marshall. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
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NEEDS ASSESSMENT FOR A CANADIAN HOUSING RETROFIT CONFERENCE

A project is underway to determine the level of housing retrofit activity in Canada and the need to share information on housing retrofit and renovation strategies. The project is focused on energy efficiency-related renovation and upgrade activities as these efforts are can cause more problems than they solve if they are not done properly. Utilities, housing providers, government agencies and renovators are being consulted to determine what energy efficiency upgrade programs are underway in Canada, what the level of renovation activities are, the problems associated with energy efficiency upgrades and the need for a national or regional forum on energy efficient upgrade measures, new technologies, precautionary practices, program design and delivery, energy ratings, etc. Based on the outcome of this survey, CMHC, in partnership with Natural Resources Canada, will determine whether or not to develop a housing retrofit conference, or conferences, to address the needs identified in the survey.

CMHC Project Officer : *Duncan Hill*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2131 0200002
STATUS : Ongoing Project
**** NEW ****

OPTIMIZE: A METHOD FOR ESTIMATING THE LIFECYCLE ENERGY AND ENVIRONMENTAL IMPACT OF A HOUSE

This computer program estimates the lifecycle energy requirements of a house as well as determining associated emissions. The program has been revised from a spreadsheet to a database to improve the instructions and user interface, and the computational speed. The application of the program is being expanded to include multiple, non part 9 national building code residential buildings by using Optimize to assess the lifecycle energy performance of the Conservation Co-op building in Ottawa.

CMHC Project Officer : *Thomas Green*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 0865 0201002
STATUS : Ongoing Project

ENERGY CONSERVATION

PHASE II: ADVANCED TECHNOLOGY DATA BROWSER

CMHC, together with Natural Resources Canada and Public Works and Government Services Canada, will sponsor the development of an advanced building technologies web site. The web site will be used to profile innovative design and construction technologies, supporting case studies and research. It is envisioned that the web site will later be supported and managed by a building industry stakeholder group made up of private sector, utility and public sector agencies. The web site will provide information on technologies that can increase building durability, affordability and occupant health and comfort while reducing resource use and environmental impact. An emphasis will be placed on "Made in Canada" products and services in support of housing export opportunities. The web site will be fully operational by July 2000.

CMHC Project Officer : *Duncan Hill*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2223 0200001
STATUS : Ongoing Project
**** NEW ****

PREPARATION OF AN EXECUTIVE OVERVIEW OF THE R-2000 HOME SYSTEM

The purpose of this project is to develop a comprehensive overview of the R-2000 housing system.

CMHC Project Officer : *Sylvain Lasnier*
Division : Canadian Housing Export Centre
AVAILABILITY : Publication is not available

CIDN : 1550 0900002
STATUS : Ongoing Project

RENTAL STOCK ENVELOPE SURVEY

The STAR Database, used for modeling Canadian housing performance, requires data from a representative number of rental houses. This project looked at rental housing stock to see how it differs from owner-occupied stock and examined how rental stock could be suitably sampled for inclusion in the STAR Database. The findings show that rental stock does differ significantly from owner-occupied stock and that STAR needs to be upgraded if it is to represent rental stock. The contractor estimated that data on an additional 175 to 200 houses would be required. Options for obtaining this data are being considered.

CMHC Project Officer : *Don Fugler*
Division : Research Division
AVAILABILITY : Publication will not be published

CIDN : 1766 0200002
STATUS : Completed Report

UPDATING THE AIRTIGHTNESS TESTING STANDARD

The airtightness testing standard, Canadian General Standards Board (CGSB) 149.10, was published in 1986 and requires updating and simplification. CMHC engaged a contractor to undertake this work in 1998/99. A draft standard has been submitted to CMHC for review before consideration by the CGSB.

CMHC Project Officer : *Don Fugler*

CIDN : 1971 0200001

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

VENTILATION IN 2 OR 3 UNIT MULTI-FAMILY BUILDINGS BEFORE AND AFTER WEATHERIZATION

Older multifamily buildings offer a great opportunity for energy savings because they are poorly insulated and are not airtight. These buildings often have no mechanical ventilation system and rely on the air leakage through the exterior envelope to provide an adequate supply of outdoor air. Sealing measures can greatly reduce the equivalent leakage area of the exterior shell and change the location of the neutral pressure plane. This has a major impact on the outdoor air supply and how it is distributed on a unit-per-unit basis.

This study investigates the outdoor air supply of a 2-unit multifamily building before and after weatherization and evaluates the effectiveness of exhaust only ventilation in weatherized buildings. Air flow was simulated with CONTAM, a software developed by the National Institute of Standards and Technology (NIST) and the case study building is typical of the buildings targeted by recent weatherization programs performed in Quebec.

The results show that outdoor air supply due to infiltration depends on the location of the unit and its degree of connectivity with the adjacent unit. For buildings whose units are relatively well connected to each other, the results show that the fresh air change rate of the top unit due to infiltration is negligible prior to weatherization and that weatherization of the roof space significantly reduces inter-zonal leakage. The results also showed that exhaust fans are ineffective in increasing outdoor air supply to the top unit of such buildings. Possible solutions include the installation of a balanced mechanical ventilation system or performing sealing works to increase the airtightness between the units. For buildings whose units are relatively isolated from one another, the results showed that exhaust-only ventilation is an effective means of providing outdoor air, especially during mild outdoor temperatures.

The findings presented herein contribute to our knowledge of ventilation issues with respect to a segment of the existing building stock which is most likely to be targeted for energy retrofits and weatherization programs in the near future. The results also shed light on the effectiveness of exhaust only ventilation as a means to increase fresh air supply to occupants.

ENERGY CONSERVATION

Determining the ventilation needs of multifamily buildings, regardless of weatherization, is a complex task. Within the scope of a weatherization program, it is important to establish an airtightness testing method which quantifies both the shell and inter-zonal leakage and to adopt a computer program which can simulate the fresh air distribution for a given design day or hourly weather profile.

Prepared by Dino Gerbasi, Siricont. CMHC Project Officer: Duncan Hill. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
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** SEE ALSO: - Re-insulation of Existing Flat-Roof Multi-Family Building in Québec, p. 100

FIRES & FIRE PREVENTION

CLEANING UP YOUR HOUSE AFTER A FIRE

"After a Fire" is a consumer publication being prepared to help homeowners deal with fire damage in their homes. This publication will explain the issues to be considered to restore the home and to ensure a safe, healthy environment for the occupants. It is intended to be a brief publication targeted to the consumer, but it will also be useful to fire departments, restoration contractors, and insurance companies. It is planned for publication by fall of 2000.

CMHC Project Officer : *Ken Ruest*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN :
STATUS : Ongoing Project
**** NEW ****

COSTS AND BENEFITS TO MUNICIPALITIES OF MANDATORY RESIDENTIAL FIRE SPRINKLERS: SUMMARY REPORT

This report presents the results of a study to assess, from an economic perspective, the costs and benefits to municipalities of the mandatory installation of fire sprinklers in all new residential construction. The study was commissioned by Canada Mortgage and Housing Corporation (CMHC), with the participation of the Ontario Ministry of Municipal Affairs and Housing, and the Office of the Ontario Fire Marshal. The National Research Council and Federation of Canadian Municipalities were also involved in the project. In Phase 1, the economic model was developed and tested using data collected from two Ontario case study municipalities, Barrie and Burlington. Subsequently, in Phase 2, revisions to the method and economic model were made and four additional case studies were carried out. The Phase 2 case study municipalities were Edmonton, Alberta; Pitt Meadows, British Columbia; Gatineau, Quebec; and Kawacatoose First Nation, Saskatchewan.

The study examines the benefits and costs of automatic sprinklers and estimates the effect of mandatory sprinklers on the cost of providing municipal fire protection services. The study also identifies the impact of sprinklers on the cost of housing development, construction and maintenance. Municipal costs, such as potential changes in municipal infrastructure, municipal insurance premiums and fire department facilities and operations, have been considered. Development costs, such as the direct provision of infrastructure or the payment of development charges, are examined. Direct construction costs, such as the installation of the sprinkler system, and ongoing operating and maintenance costs for the homeowner, are also identified.

Prepared by: Arencon Inc. with the assistance of Clayton Research Associates Limited, Graham Harmsworth Lai & Associates Ltd., and J.G. Henderson & Associates. CMHC Project Managers: Tom Kerwin, Mark Holzman, Nicole Parent. Ottawa: Canada Mortgage and Housing Corporation, 1999, c1998. (Housing Affordability and Finance Series Research Report)

Order number: PE0314 **Price: $12.95 + GST and handling charges.

STATUS : Completed Report

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FIRE RESISTANCE TESTS ON FULL-SCALE FLOOR ASSEMBLIES

This report presents the results of 32 standard fire resistance tests conducted on full-scale floor assemblies as part of the collaborative industry-government research program investigating the effects on the fire resistance of lightweight floor assemblies of subfloor material, gypsum board screw spacing from board edges, wood-I-joist type, method of fastening the gypsum board butt ends, insulation type, number of gypsum board layers, joist spacing, resilient channel spacing, addition of concrete topping, steel/concrete composite systems and structural load.

Prepared by: M.A. Sultan, Y.P. Seguin, P. Leroux, Institute for Research in Construction, National Research Council. Prepared for Boise Cascade Corporation, Canada Mortgage and Housing Corporation, Canadian Home Builders' Association ... et al. CMHC Project Officer: Jacques Rousseau. Ottawa: CMHC, 1998.

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre

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IMPACT ON LIFE RISK OF MANDATORY SPRINKLERS IN RESIDENTIAL BUILDINS

The fire risk assessment model, developed by the National Research Council of Canada (NRC), was used to assess whether an apartment building with sprinkler protection but with increased fire department response time provides a level of fire safety for the occupants equivalent to that in a building without sprinkler protection but with the current fire department response time. The NRC model is called FiRECAM™ (Fire Risk Evaluation and Cost Assessment Model). The model assesses the expected risk to life and the fire costs in a building based on the dynamic interaction of fire and smoke spread, occupant evacuation and fire department response.

In this study, a 3-storey apartment building is used as a representative building in a new development area of a municipality, where buildings may range from a single family house to a medium-rise apartment building. The expected risk to life to the occupants is assessed with and without added sprinkler protection and with two levels of fire department response: with and without new fire stations.

New development areas in five cities are used in this study. They are Barrie and Burlington in Ontario; Pitt Meadows, B.C.; Edmonton, Alberta; and Gatineau, Quebec. In each municipality, the response times of the fire department are calculated using existing fire stations and added new stations. Future stations were previously determined by the municipal fire departments to meet protection needs for projected populations. In addition, the impact of mandatory sprinklers in an existing First Nations Community, Kawacatoose in Saskatchewan, is also assessed.

The results of this study show that, using a 3-storey apartment building as a model building, the provision of sprinkler protection and a longer than normal fire department response time (i.e. no new fire stations) provides a level of fire safety better than the case without sprinkler protection but with a normal fire department response time (i.e. with new fire stations). Based on similarity considerations in fire and smoke spread and occupant evacuation between single family houses and apartment buildings, the impacts of mandatory sprinklers on the expected risk to life, obtained for 3-storey apartment buildings, are argued to be applicable to single family houses.

Prepared by D. Yung, G.V. Hadjisophocleous, N. Benichou and Q. Liu. Prepared for Canada Mortgage and Housing Corporation. Ottawa: Institute for Research in Construction, National Research Council Canada, 1999.

STATUS : Completed Report

AVAILABILITY : Institute for Research in Construction
National Research Council Canada
1500 Montreal Road
Ottawa, Ontario
K1A 0R6

INVESTIGATION OF SMOKE CONTROL IN HIGH-RISES BY POSITIVE PRESSURE VENTILATION

A research project has been initiated to study the use of positive pressure ventilation (PPV) systems to contain and expel smoke from high-rise buildings during a fire emergency. PPV systems have been used in the U.S. in low-rise buildings. The system consists of a portable, high velocity fan which is used by the fire department to clear smoke from buildings in order to facilitate access to the fire and to aid in occupant evacuation. Preliminary studies have been conducted in multi-unit residential buildings but not in cold climates where stack effect may continue to dominate smoke movement. The research program is the result of a joint venture between CMHC, the City of Ottawa Fire Department and the Fire Laboratory of the Institute for Research in Construction of NRC. The ability of PPV to contain and clear smoke from exitways in high-rise buildings will be evaluated at the Fire Laboratory's full scale test building under both summer and winter conditions. If successful, PPV may offer Fire Departments an effective, lower cost, life and property saving tool.

CMHC Project Officer : *Duncan Hill*

CIDN : 1983 0200002

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

LEARN NOT TO BURN CURRICULUM FOR ABORIGINAL COMMUNITIES

The purpose of this project is to modify the Learn Not to Burn curriculum, successfully developed and used by the U.S. National Fire Protection Agency (NFPA), for usage in Canadian First Nations communities. The Aboriginal curriculum has been developed by the Assembly of First Nations, with the assistance of the NFPA, the Aboriginal Firefighters' Association and CMHC, pilot tested in several First Nations classrooms, and will be available for K-2 modules in mid 2000.

CMHC Project Officer : *Alain Croteau*

CIDN : 1719 0300001

Division : Assisted Housing Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

SOUND AND FIRE PERFORMANCE OF FIRE STOPS IN MULTI-FAMILY DWELLINGS: FIRE SPREAD IN WALL-FLOOR JOINTS OF MULTI-FAMILY DWELLINGS

This report presents the results of 3 full-scale tests conducted at the Institute for Research in Construction, National Research Council of Canada on double stud party wall/floor joints. The assemblies were tested in a floor furnace using the CAN/ULC-S101-M89 temperature-time relationship. This study was part of a joint research project on the fire and sound flanking at the wall/floor joints in double stud wall assemblies.

Assemblies No. 1 and No. 2 were tested with various fire stop materials: semi-rigid glass and rock fibre insulation boards, sheet steel and Oriented Strand Board (OSB) placed between the joist headers, to investigate whether these materials will prevent flame spread into the upper storey cavity between studs for 15 min. Assembly No. 3 was tested, with no fire stop material in the space between the joist headers, to investigate the effect of the width of the vertical air space (12.7 mm, 25.4 mm and 38.1 mm) between insulated double-stud frames on flame spread to the upper storey cavity between studs.

Prepared by: M.A. Sultan, Y.P. Seguin, P. Leroux, Institute for Research in Construction, National Research Council. Prepared for Canada Mortgage and Housing Corporation ... et al. CMHC Project Officer: Jacques Rousseau. Ottawa: CMHC, 1997.

STATUS : Completed Report

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SINISTRE DE JUILLET 1996 AU SAGUENAY: CONSÉQUENCES SUR LA REDÉFINITION DE L'HABITAT

The intent of this research is to allow one to appreciate, based on a target population in the Saguenay region, the consequences of a natural disaster in the design of one's home and the role this plays in the various stages disaster victims go through when they are required to relocate involuntarily. In more specific terms, this research attempts to answer the following questions:

- What were the residential itineraries of families which were uprooted against their will as a result of the floods of July 1996?
- What modifications did those who were involuntarily located make to their homes?
- What mechanisms did these people resort to in order to integrate into their new communities?
- What decision-making strategies could be used to take into account the needs and the living experience of relocated persons?

The research strategy takes a qualitative approach which involves interviews with about forty persons or couples who lost their homes and all their personal possessions during the floods of July 1996. Two verification instruments are used to explain what has been observed - semi-directed interviews and fact sheets. The answers to the questions asked produced the following findings. In addition to the physical and psychological effects of the direct consequences of the disaster and the numerous related difficulties, several aspects of the victims' personal, family, professional and social lives changed - (a) residential itineraries (most victims relocated three or four times before taking up their current residence) were a source of major tension; (b) integration into new neighbourhoods was mainly achieved with the participation of family and friends, and the new neighbours were often left out of the process. According to the disaster victims, living in a new neighbourhood means a break or even mourning, e.g. "A separation from friends, the loss of a feeling of security, changes in lifestyle, financial constraints, etc.; (c) the loss of "this paradise (...) this great corner of the world" elicits a new definition of the housing which is marked by images or representations that are negative (feeling of strangeness, nostalgia, indebtedness, sentimental losses, etc.); (d) finally, disaster victims have some suggestions to pass on to others who suffer a similar fate to inform and guide them. They suggest that victims take a step back before they make any important decisions. If volunteers are required at all times to display an understanding and generous attitude, the various levels of government should reduce bureaucratic and administrative requirements. Another suggestion offered by disaster victims was to extend the period during which financial and psychological help would be provided.

Prepared by Danielle Maltais, Suzie Robichaud. CMHC Project Officer: Marcel Boily.

Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : Completed Report

FLOODS

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HEATING AND VENTILATION

ASSESSING THE PARAMETERS FOR VENTILATION SYSTEMS IN MULTI-UNIT RESIDENTIAL BUILDINGS

This research project will determine the ventilation requirements for apartments. Equipment and systems will be evaluated in their ability to meet such requirements in the context of building design, occupancy type and recent experiences in the application of ventilation systems in multi-unit residential buildings. Design and installation recommendations will be created for use by building designers. Technology gaps (e.g.; the absence of appropriate equipment) will also be identified for the benefit of future research and development efforts.

CMHC Project Officer : *Duncan Hill*
Division : Research Division
AVAILABILITY : Publication is not available

STATUS : Planned
**** NEW PROJECT ****

CHARACTERIZATION OF AIR LEAKAGE, PRESSURE REGIMES AND RESULTANT AIR MOVEMENT IN HIGH-RISE RESIDENTIAL BUILDINGS

The purpose of this project is to undertake a field investigation of the ventilation and infiltration in a residential highrise building. CMHC, in cooperation with the Institute of Research in Construction, will monitor indoor-outdoor air pressure regimes in a highrise for a period of one year. Ventilation system performance will also be assessed. Pressure regime measurements, in conjunction with measured air leakage characteristics of selected assemblies, will be used to estimate real-time air movement across the building envelope. This information will add to the body of knowledge governing infiltration-ventilation regimes and resultant heat load calculations in buildings.

CMHC Project Officer : *Duncan Hill*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1934 0200005
STATUS : Ongoing Project

COMPARISON OF CENTRAL AND ENSUITE SPACE / DOMESTIC HOT WATER HEATING SYSTEMS FOR MULTI-UNIT RESIDENTIAL BUILDINGS

This research project will assess the relative costs and fuel usage of central and ensuite space and domestic hot water ensuite system. This work will determine whether or not there are differences in fuel systems in multi-unit residential buildings. Fuel billing histories of multi-unit residential buildings will be reviewed to identify the annual operating costs and fuel used by multi-unit buildings that have either central space and hot water heating systems or usage and operating costs in buildings of similar size, occupancy, age and location. This information will be useful to property owners, managers and developers when they are in the process of deciding whether or not to invest in central or ensuite systems for their buildings. The project is expected to be complete by December 2000.

CMHC Project Officer : *Duncan Hill*
Division : Research Division
AVAILABILITY : Publication is not available

STATUS : Planned
**** NEW PROJECT ****

CORROSION OF DOMESTIC OIL TANKS

The objective of this External Research project was to investigate the corrosion of domestic oil tanks. Based on the findings, a number of predictive/preventative maintenance techniques as well as changes to tank fabrication were explored.

The project found:

- There is no significant difference in the composition or properties of the steel used today than what was used more than 30 years ago. Tank sludge is relatively, chemically neutral and the results of the micro biological testing do not support bacteria as the cause of corrosion.

- The primary cause of accelerated corrosion based on the findings of this research appears to be chloride-laden water. Water and chloride can gain entry into a domestic oil tank through a number of means, e.g., atmospheric moist air and salt-water fog, water leaks, sea water contamination.

- Using non-corrosive materials, e.g. stainless steel, fiberglass, bladders, to manufacture oil tanks is one way to prevent internal corrosion. A more economical approach would be to remove the corroding medium, i.e., water. Domestic oil tanks can be checked for water accumulation quite easily by using a water indicating paste. This process could be included as part of an oil burner technician's annual inspection.

Prepared by William Moody. CMHC Project Officer: Darrel Smith. Ottawa: Canada Mortgage and Housing Corporation, 2000. (External Research Program)

STATUS : New Completed Report

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DAWSON CITY DEMONSTRATION PROJECT - MONITORING

The objective of this project is to evaluate the state of the mechanical & monitoring system, conduct an on-site inspection in Dawson City, and develop a proposal for monitoring & analyzing the system's performance.

CMHC Project Officer : *Rob Duncan*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1676 0300005
STATUS : Planned
*** NEW PROJECT ***

EVALUATION OF RESIDENTIAL FURNACE FILTERS

Forced air furnaces are a common Canadian heating system. Traditionally, filters placed in the circulating air ductwork were designed to protect the furnace and fans. Over the last several years, there has been increased emphasis on improving the filtration efficiency with the goal of reducing occupant exposure to respirable particulate.

This project tested the performance of different filters in actual houses, from disposable fiberglass to electrostatic precipitators. The contractor looked at how air filtration affects the levels of particulates (airborne dust) in housing, and at the production of ozone by electrostatic precipitators.

Analysis shows that good filters do remove particulates at rates that are close to their rated performance. For example, the most effective filter tested, an electrostatic precipitator, reduced the quantity of particulate in the air in the duct from 70% - 90 % in different tests. But, because particulate is constantly infiltrating the house and is being created by occupant activities, the tests showed that when this very good filter was in operation, the concentration of airborne particulate in the house air was reduced only 40%. All other filters tested, being less efficient, fell in the range of less than 40% reduction. As well, these filters only work when the furnace fan is on. If the fan is not run continuously, installing good filtration will be even less effective.

A more comprehensive dust-reduction program is necessary (e.g. reducing house air leakage, better and more frequent vacuuming, reducing house particulate sources, etc.) to make a significant reduction in house airborne particulate, rather than simply increasing furnace filter efficiency. Upgrading filters is only a partial solution.

Prepared by Dara Bowser, Bowser Technical Inc. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Don Fugler. CMHC, 1999. (Housing Technology Series)

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EVALUATION OF RESIDENTIAL, IN-DUCT AIR FILTERS

There are many residential air filters that have appeared in the last several years, providing an abundance of choice for consumers. Unfortunately, consumers have little objective information on the relative performance of these filters. This project is testing the performance of different filters, from disposable fiberglass to electrostatic precipitators, in houses. The contractor has looked at how air filtration affects the levels of particulates (dust) in housing, and at the production of ozone by electrostatic precipitators. Testing is complete in the six sample houses and a report has been published. Fifteen houses with existing electrostatic precipitators have been sampled for indoor ozone concentrations in late Fall of 1998. Analysis shows that good filters do remove particulates at rates that are close to their rated performance. However, the use of a good filter will not necessarily render house air pristine due to large particulate sources both inside and outside the house. An "About Your House" draft has been issued on these initial findings plus the research report and conference papers. A second phase of the research is starting that will look at issues such as ozone, particulate migration through the building envelope, and dust resuspension on hard vs. carpeted floors.

CMHC Project Officer : *Don Fugler* ***STATUS*** : Ongoing Project

Division : Research Division

FIELD SURVEY OF HEAT RECOVERY VENTILATION SYSTEMS

Ventilation is one of the most important design issues of the 90's in the Canadian construction industry. Building codes promote the comfort and safety of occupants by ensuring fresh air is provided to new homes, and stale, contaminated air is exhausted outdoors. Increasingly, these code requirements are being satisfied by the use of packaged heat recovery ventilators (HRVs).

Given the increased reliance on HRVs for ventilation, several authorities expressed a desire to explore and assess the relationships between home design, mechanical ventilation system design, installation practices and occupant use of ventilation systems as they relate to the effectiveness of ventilation of the dwelling. In response to such concerns, Canada Mortgage and Housing Corporation engaged Buchan, Lawton, Parent Ltd to study the field performance of HRV ventilation systems.

The conclusions drawn from these results will make it possible to improve installation practices, HRV system performance, and occupant understanding of and interaction with their HRV system.

The project involved four phases: I) inspections of 60 homes with HRV ventilation systems, 2) survey of the occupants of the 60 households to determine their understanding and usage of their HRV ventilation systems and a telephone survey of a further 15 households, 3) intensive performance testing of existing HRV ventilation systems, and 4) intensive performance testing of experimental HRV ventilation systems.

The methodology for Phases III and IV involved the use of a trace concentration of gas to assess air change rates. Sulphur Hexafluoride, an innocuous gas not found in household environments, was released at predetermined points throughout the house and mixed by mechanical means until similar concentrations were achieved throughout the house. By measuring the decay in the concentration of the gas, the apparent air change rates were derived. The operating conditions of the ventilation system and the locations of the sampling points had an impact on the extent to which the measurements reflected whole house ventilation rates, room-by-room ventilation rates, natural air change rates caused by forces other than mechanical ventilation systems, or other factors related to ventilation, such as short circuiting within rooms, and cross contamination.

The common types of HRV installations investigated under this study (fully ducted, simplified and extended) were capable of performing well. The majority of the HRV ventilation systems were operating and were perceived to be providing a benefit to the occupants of the houses. Far greater benefits were possible, however, and considerable improvements could be made in installation practice, system performance, occupant understanding and occupant interaction with their system.

Prepared by Buchan, Lawton, Parent Ltd (Toronto & Ottawa) and Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1998.

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
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FIELD TESTS OF VENTILATION SYSTEMS DESIGNED TO MEET 1995 NBC

This study concerns new houses designed and built to provincial or municipal codes that require the 1995 National Building Code. Ventilation requirements in recent Canadian building codes have become more complex and problematic to builders. The ventilation design needs to balance fresh air and exhausting air, and to consider house depressurization factors. The research team performed air testing on forty-one new houses in the western provinces, the North, and the Maritimes to verify their compliance with code required ventilation. Eleven houses were tested in Ontario, where the building code differs slightly from 1995 NBC. No houses complied with all appropriate codes and standards; many had dangerous levels of house depressurization. The research findings are being disseminated throughout the builder, code official, and research communities in order to solicit solutions. A Task Group has been started under National Research Council. The contractor has tested potentially compliant systems in three houses in Manitoba in December 1999 and January 2000. Results look promising for these houses.

CMHC Project Officer : *Don Fugler*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN : 2062 0200001

STATUS : Ongoing Project

HVAC SYSTEMS OF MID AND HIGH-RISE RESIDENTIAL BUILDINGS

An evaluation of the mechanical systems of 25 mid and high-rise residential buildings has been performed in order to determine the changes in design and installation practices required by the 1995 National Building and Energy Codes. Additionally, the performance of the mechanical ventilation systems has been assessed in 10 buildings in terms of design criteria, design procedures, system strategies and installed performance levels. The research found that air tends to move through apartment buildings more by accident than design. This is due to a lack of information on the environmental conditions and building physical characteristics that govern natural and mechanical air flow. Consequently, it is difficult to ensure that there is adequate fresh air delivery to any point in a building, given conventional mechanical air system design. This information will be used to produce advisory documents showing how to meet codes and improve system performance.

HEATING AND VENTILATION

CMHC Project Officer : *Duncan Hill*

CIDN : 1424 0200001

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

IDENTIFYING AND REMOVING POLLUTANTS FORM HEAT RECOVERY VENTILATORS

This study investigated the presence of allergens such as dust and molds in heat recovery ventilation systems and the duct work. It also looked at two different types of cleaning equipment and their ability to clean these pollutants from the rigid and flexible ductwork and heat recovery ventilator (HRV) cores in dedicated balanced supply and exhaust ventilation systems. Samples from the ductwork and cores of ten ventilation systems were tested for levels of dust and mold. The ductwork and cores were then cleaned using standard ductwork cleaning apparatus, then tested again to indicate the success of the cleaning process. All houses were tested for air and surface mold counts using an RCS air sampler and typical swab collection systems. Two of the ten houses were re-tested over a period of fifteen months. There were high mold counts on the surfaces of the supply air ducts. However, there was no correlation to house air mold counts, which were found to be inconclusive. It could not be determined whether airborne molds were considered a health risk in the houses as tested. It was also found that conventional equipment was not effective in cleaning the ductwork systems.

Prepared by Terry Watters, Sustainable Housing and Education Consultants Ltd. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : Completed Report

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HEATING AND VENTILATION

LOW TEMPERATURE HYDRONIC HEATING SYSTEMS

The objective of this project is to describe the advantages and disadvantages of incorporating hydronic heating systems in buildings. The project will investigate low temperature hydronic systems (LTHS) that can operate using a greater range of energy sources than those that currently require higher temperatures. Additional information and action needed to assess, document, and appropriately advance LTHS will be identified.

CMHC Project Officer : *Ken Ruest*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1570 0200001
STATUS : Ongoing Project

MECHANICAL VENTILATION OF HOUSES

CMHC participates on the National Building Code's Standing Committee Task Group on Review of Mechanical Ventilation Requirements on Houses. The Corporation is contributing to a Task Group project to redraft the ventilation sections of the National Building Code. This draft will presently be reviewed by the Task Group.

CMHC Project Officer : *Don Fugler*
Division : Research Division
AVAILABILITY : Publication will not be published

CIDN : 1584 0200002
STATUS : Ongoing Project
**** NEW ****

MONITORING A DUEL HEATING SYSTEM INSTALLATION

This research will monitor and assess the performance of a dual fuel heating system in an 89 suite apartment building. Originally, the building was heated with electric baseboards. The presence of natural gas fired boilers allowed the installation of hydronic radiant panels within apartments to shift the heating load from electricity to natural gas. Following the installation of the system, the energy consumption of the building was tracked for a one-year period. A report will be issued that describes the system and its potential to reduce energy costs.

CMHC Project Officer : *Duncan Hill*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1899 0200004
STATUS : Ongoing Project

HEATING AND VENTILATION

PART-LOAD AND FROSTING CONTROL FOR ROTARY ENERGY WHEELS USED IN RESIDENTIAL BUILDINGS

The objective of this research is to determine the performance of rotary energy wheels, also called enthalpy wheels, for ventilation air exchange in residential buildings while subjected to a wide range of operating conditions.

CMHC Project Officer : *Duncan Hill*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 2007 0200001
STATUS : Ongoing Project

RETROFITTING VENTILATION

This project is to examine how effectively ventilation can be retrofitted to existing houses, either as a standalone project or as part of a larger renovation. The research team will test the effectiveness of retrofitted ventilation systems in older homes and their effects on indoor air quality. It will also describe practical methods for installing ventilation equipment and ducting in older homes.

CMHC Project Officer : *Don Fugler*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2063 0200001
STATUS : Ongoing Project

REWRITING TEST STANDARD CAN/CGSB-149.10 - DETERMINATION OF THE AIRTIGHTNESS OF BUILDING ENVELOPES BY THE FAN DEPRESSURIZATION METHOD

The objective of this project is to re-write the airtightness test standard CAN/CGSB-149.10.

CMHC Project Officer : *Don Fugler*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1971 0200002
STATUS : Ongoing Project

HEATING AND VENTILATION

TO ASSESS THE PERFORMANCE OF THE LEBRETON FLATS DISTRICT HEATING SYSTEM

The Lebreton Flats district heating system, installed 20 years ago, is one of few examples of low temperature district heating systems in North America. The availability of fuel consumption and maintenance records for the system allows for an assessment of the performance of the system over the last 20 year period. It will also allow for a comparison of the district system with more conventional heating system options. Monitoring will be undertaken to assess the performance of the plant. Recommendations regarding system performance, potential upgrades and future operation, maintenance needs and other ownership/management arrangements will be made.

CMHC Project Officer : *Duncan Hill*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2134 0200001
STATUS : Ongoing Project

HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

ADVISORY DOCUMENT ON MECHANICAL AND ELECTRICAL SYSTEMS IN MULTI-UNIT RESIDENTIAL BUILDINGS

An advisory document on the design of plumbing, heating, ventilation and air conditioning, lighting and power systems in multiple-unit buildings has been reviewed by practitioners. The system design and installation practices noted in the report are being modified to reflect their comments. An advisory document entitled "Mechanical and Electrical Systems in Apartments and Multi-Suite Buildings " will be published to recommend "good engineering practice" for designers, owners and consultants. This publication should be available by July, 2000.

CMHC Project Officer : *Duncan Hill*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1774 0300004
STATUS : Ongoing Project

ASSESSMENT REPAIR STRATEGY FOR EXISTING BUILDINGS CONSTRUCTED WITH MASONRY VENEER STEEL STUD WALLS

Canada Mortgage and Housing Corporation (CMHC) retained T.W.J. Trestain Structural Engineering to undertake a review of assessment and repair techniques for problem masonry veneer steel stud (MV/SS) walls. This document is intended to define state-of-the-art "good practice", a needed reference point upon which evaluations of deficiencies, renovation strategies and construction methods can be based.

Two competing approaches to field investigation are discussed - the medical model versus the technical audit model. Neither approach is sufficient on its own and a blended model is therefore proposed. Methods of gathering field information are discussed including a proposed systematic approach to the review of problem MV/SS walls. The successful diagnosis(es) of problem MV/SS walls requires an understanding of the basic engineering and building science issues. Accordingly, typical MV/SS deficiencies and the consequences associated with those deficiencies are presented.

In order to assist the investigator to answer the question "Is it good enough?", a number of analysis tools are proposed along with some suggested decision making criteria. The analysis tools include reduced Limit States Design load factors, conventional analysis, finite element analysis and full-scale field testing. The basic analysis routine for the finite element program was developed as part of another CMHC project and then customized with a number of features specifically for this project. Lastly, a compendium of possible maintain or restore strategies is presented for problem MV/SS walls. Included is a section on economic analysis which provides guidance on the optimum course of action that best meets the needs of public safety, building performance and the financial position of the building owners.

Prepared by T. W.J. Trestain. Prepared for Technical Policy and Research Division, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1996.

STATUS : Completed Report

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BC MOISTURE PROBLEMS - COMPUTER SIMULATIONS

This research will study, through the use of computer simulations using the WALLDRY computer program, the drying potential of various wall configurations and is intended to provide data to bolster recommendations to be incorporated in the "Best Practice Guide for the Coastal Area of British Columbia". The results of the work will also be used to guide in the development of the Envelope Drying Rate Analysis Project. As the cost of doing all the tests proposed is prohibitive, it was recommended that computer simulation WALLDRY be used to determine which walls might be more promising to test than others, potentially leading to a reduction in the cost of the test program.

CMHC Project Officer : *Jacques Rousseau*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1816 0300004
STATUS : Ongoing Project

BC MOISTURE PROBLEMS - ENVELOPE DRYING RATES EXPERIMENT

Findings from the 'Survey of Building Envelope Failures in the Coastal Climate of British Columbia' revealed that the construction of walls with face seal or concealed barrier systems does not promote rapid drying of wall assemblies once the moisture has saturated the moisture barrier and passed into the sheathing. The solution to promote drying of the wall assembly has been to introduce an air cavity behind the claddings. The objective of this project is to identify, through laboratory work, a range of cavity and vent configurations which will provide wall drying capability characteristics necessary to deal with the coastal British Columbia climate. In addition to the vents, the effect of insulation, vapour barrier, type of building paper and type of cladding will be investigated.

CMHC Project Officer : *Mark Salerno, Sylvio Plescia*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1816 0300009
STATUS : Ongoing Project

BC MOISTURE PROBLEMS - HYGROTHERMAL PERFORMANCE OF STUCCO

The project objectives are to develop fundamental and applied understanding of the hygrothermal performance of stucco based wall systems for Vancouver, B.C. weather conditions. The properties of different stucco samples obtained in the field will be investigated through laboratory evaluation (part of this work is completed). The long term hygrothermal behaviour of the building envelope components will be simulated using the LATENITE computer program. The result of the work will guide the "Envelope Drying Rate Analysis" study. The work is being collaboratively funded with the NRC/Institute for Research in Construction and is part of the recently launched Consortium on Moisture Control Strategies of Wall Systems.

CMHC Project Officer : *Jacques Rousseau, Mark Salerno*

CIDN : 1816 0300007

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

BC MOISTURE PROBLEMS - QUALITY ASSURANCE PROTOCOL

The objective of this study was to produce a protocol which will form the baseline quality management system for the exterior envelope of 3 and 4 storey wood frame construction in British Columbia. The protocol deals with the conclusion and recommendations identified in the "Survey of Building Envelope Failure in the Coastal Climate of British Columbia". The protocol will also tie into the "Best Practice Guide for Wood Frame Construction in the Coastal Climate of British Columbia". The draft protocol has been reviewed and is being tested in a real project in order to refine it.

CMHC Project Officer : *Jacques Rousseau, Mark Salerno*

CIDN : 1816 0300006

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

BC MOISTURE PROBLEMS - SMALL SCALE TESTING AND DEVELOPMENT PROTOCOL

This work results from the conclusions and recommendations of the "Survey of Building Failures in the Coastal Climate of British Columbia". The intent of this initial testing project was to give the industry some sense of what will or will not work and examine the sensitivity of the various systems to specific variables. The testing provided a relative comparison under a specific set of environmental conditions. Although the work did not provide a definitive solution, it did demonstrate that the drying potential due to diffusion in the coastal climatic environment was very small. The work has been used to develop the protocol for the "Envelope Drying Rate Analysis" which is currently underway to investigate other drying mechanisms. This project was funded in collaboration with the NRC/Institute for Research in Construction, the City of Vancouver, Van Maren Limited, Centreville Limited and Aquastap Limited.

HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

CMHC Project Officer : *Jacques Rousseau, Mark Salerno*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1816 0300005
STATUS : Ongoing Project

BEST PRACTICE GUIDE - FIRE AND SOUND ASSEMBLIES FOR MULTI-FAMILY BUILDINGS

This document, targeted at designers of multi-family buildings, will provide the latest information on CMHC research into fire and sound partitions, floors, flanking, plumbing noise, etc. The document is being produced in collaboration with the NRC/IRC.

CMHC Project Officer : *Ken Ruest*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1804 0300003
STATUS : Ongoing Project

BEST PRACTICE GUIDE FOR EXTERIOR INSULATED FINISHED SYSTEMS (EIFS)

A Best Practice Guide governing the design and installation of EIFS systems will be developed. The guide will be intended for designers and will provide guidance for common details in the building envelope design , as they relate to EIF systems.

CMHC Project Officer : *Luis de Miguel*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2047 0200001
STATUS : Ongoing Project

HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

BRITISH COLUMBIA HIGH-RISE ENVELOPE DETAILS STUDY

In recent years, there have been significant efforts to understand and resolve moisture ingress and deterioration problems associated with wood-framed, low-rise building construction. Currently, this problem is acute in some wood-frame condominiums in the Lower Mainland of British Columbia. There are indications that the high-rise stock may also be experiencing similar moisture problems. The objective of this project is to examine the files of a sample of approximately forty buildings to assess whether the high-rise stock in the coastal climate of lower mainland BC is experiencing significant moisture related problems. The project will not estimate the extent of a potential problem. The project will focus specifically on envelope details and envelope systems that have failed, rather than building failures. Envelope types and components under review will include window/wall assemblies and light-gauge steel stud (back-up) wall assemblies with stucco, masonry and EIFS cladding systems. The work is scheduled for completion in the summer of 2000.

CMHC Project Officer : *Mark Salerno, Silvio Plescia* **STATUS** : Planned

Division : Research Division **** NEW PROJECT ****

AVAILABILITY : Publication is not available

CASE STUDIES FOR INNOVATIVE TECHNOLOGY AND SOLUTIONS IN SUCCESSFUL MULTI-FAMILY HOUSING

Successful innovative Canadian multi-family residential buildings are being identified and documented for future monitoring. Areas such as durable building envelope, energy savings, life-cycle costs and environmentally responsive solutions will be evaluated. One multi-family residential building, the Conservation Co-operative, was selected for evaluation and was presented at the Green Building Challenge in Vancouver in the Fall of 1998. Posters of several Canadian residential projects were prepared for the October GBC conference. The selected systems are the subject of illustrated case stories which also are available on the Research website www.cmhc-schl.gc.ca/research/highrise under the title Building Innovation.

CMHC Project Officer : *Sandra Marshall* ***CIDN*** : 1817 0300001

Division : Research Division ***STATUS*** : Ongoing Project

AVAILABILITY : Publication is not available

HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

CASE STUDY OF THE RENOVATION OF AN APARTMENT BUILDING WITH SOLID MASONRY WALLS

A 90 year old commercial building with solid masonry walls has been gutted and renovated into a residential building for low income single persons. The renovation involved the addition of thermal insulation to the building envelope, the application of stucco to the exterior of three of the four sides of the building, restoration to the front masonry facade, installation of a balanced mechanical ventilation system and a combination hydronic baseboard/radiant floor heating system. The building envelope is being monitored to provide an indication of its potential long-term performance. Energy use and indoor air quality will also be monitored in the renovated building to assess the strengths and weaknesses of the renovation strategy. A case study will be produced to document the work undertaken and the results of the performance monitoring.

CMHC Project Officer : *Duncan Hill*
CIDN : 1730 0300002
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

CHARACTERIZATION OF THE STOCK OF CONDOMINIUM BUILDINGS IN CANADA

The number and characteristics of condominiums in Canada are unknown. This project will review Statscan data files to estimate the number of condominiums in Canada, their location, age, number of stories and number of suites. This information will be used to supplement the CMHC Rental Market Survey in order to estimate the overall population of multi-unit residential buildings in Canada. This information will also be used to determine the data requirements for a database of multi-unit buildings that describes the physical characteristics and energy consumption patterns of this class of buildings. Such a database is necessary to establish energy retrofit guidelines for multi-unit residential buildings. The project will be completed by September 2000.

CMHC Project Officer : *Duncan Hill*
STATUS : Planned
Division : Research Division
**** NEW PROJECT ****
AVAILABILITY : Publication is not available

COMPARATIVE ANALYSIS OF RESIDENTIAL CONSTRUCTION IN SEATTLE, WA AND VANCOUVER, B.C.

The purpose of this study was to compare wood frame residential buildings located in Vancouver B.C. and Seattle, WA and identify potential causal factors of building envelope problems. The comparative analysis will highlight any differences in construction materials, methods or codes/regulations which dictate specific techniques or building characteristics. The basic objective was to pinpoint any obvious differences that can be concluded as avoiding the typical causal factors leading to building envelope failure.

Four buildings were studied and compared; two «problem» buildings (one in each of Vancouver and Seattle) which had experienced problems, and two «control» buildings which had not experienced problems. The building attributes used as selection criteria for the sampling were: three to four storey wood-frame, stucco clad, built in last ten years as market (Strata or Condominium title) residential buildings.

The results of the study found some legislative (insurance) and contracting (bonding) differences, have created a more heavily regulated building industry in Seattle. This, allied with the slower economic activity in Seattle, may be a factor in improving the quality of residential construction, but there are as yet no available statistics (a current survey anticipates results in April 1999), which can provide comparable data of envelope performance problems or percentage of incidence to number of residential units.

The comparison of construction materials and envelope assemblies found some differences in sheathing material (gypsum board) and variability in the application of a vapour retarder. However, these differences did not appear to be significant in creating different causal factors leading to moisture related building envelope failures. The problem buildings in fact exhibited the same problematic features with respect to water management principles and failed to effectively balance moisture ingress, drainage and drying mechanisms. The prime failure mechanism in both locales is water bypassing the weather barrier and lack of protection of the sheathing from wetting (from an exterior source not interior moisture source).

The conclusions from the study indicate that face sealed design strategies are very sensitive to climatic/exposure and construction variables and therefore the reliance on concealed barrier systems is unlikely to achieve acceptable performance. Rainscreen wall assemblies offer the best opportunity to achieve acceptable performance.

Ottawa: Canada Mortgage and Housing Corporation, BERC, 1999.

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

CONDITION SURVEY OF HIGH-RISE RENTAL STOCK IN THE CITY OF TORONTO

This study was completed in two phases and provided two deliverables expected to be useful for future building evaluation and repair assessment. Phase I was the development of a survey instrument suitable for the assessment of high-rise rental housing condition and costs for repair. Phase II was the actual survey of buildings and the analysis of the findings.

The objective of the Phase II survey of buildings was to determine actual on site data on a statistically relevant sampling of buildings. A unique form of survey was needed to permit a relatively large sampling of buildings at a reasonably low cost per building. The survey protocol developed in Phase I allows easy recording of the data by suitably skilled people. The database structure employed to analyze the data is based on Microsoft Access and can be refined as needed to permit specific assessments.

The primary output is a survey of 63 high-rise buildings, in the Cities of Toronto and York, providing comprehensive building condition and repair data. The survey results are available for analysis; however, the actual building addresses and ownership was maintained in confidence. The results of the study are presented in this report. A separate database is provided, including the building data, but excluding address and ownership details.

The study was initiated out of a need to better understand the condition of the high-rise rental housing stock and thus, to be able to better come to grips with the needs of the buildings in order to sustain the stock into the future. While it is known that the majority of the existing high-rise rental stock in the Toronto area is in the order of 30 years old, reliable information on building condition, costs and repair needs are not well documented in a readily retrievable form. The study structure thus developed to meet the following goals:

- to sample the buildings in Central Toronto and determine costs for repair and condition of the buildings on the basis of a more reasonable cross-section of the building population.

- to improve on the cost and condition information by providing 1) condition and cost data on a large sample of buildings; 2) costs over a ten year period; and 3) a range and frequency distribution of costs for buildings, different building systems and different repair periods in the future.

- to provide data on the condition of buildings that will facilitate the direction of research appropriate to building repair strategies.

HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

Prepared by Gerald R. Genge Building Consultants Inc. Prepared for Canada Mortgage and Housing Corporation, the City of Toronto and the City of York. CMHC Project Officer: Sandra Marshall. Sutton West, ON: Gerald R. Genge, 1998. 2 volumes.

STATUS : New Completed Report

AVAILABILITY : Available only on a loan basis from:

Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca

CONTRIBUTION TO THE PREPARATION OF AN ANALYSIS OF OPERATING AND MAINTENANCE COSTS STUDY

The objective of this project is to obtain up-to-date and regional financial information on operating and maintenance costs for approximately 100 multiple housing projects, using year end financial statements.

CMHC Project Officer : *Sandra Marshall*
CIDN : 1561 0300003
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

CONVERSION OF HIGH-RISE BUILDINGS TO RESIDENTIAL USE

The project will survey design and construction professionals and property managers of existing converted buildings across Canada to determine the extent and nature of technical problems which were encountered in the design and construction phases of the conversions; to determine the perception of property managers of the comfort and concerns of the occupants; to determine the technical problems which have arisen as a result of these conversions; to determine if there were any attempts to improve energy use performance or to introduce features to improve the sustainability of these buildings. Selected building would be documented as case studies in CMHC's Better Buildings information series. The research report on this study is expected to be completed by summer of 2000.

CMHC Project Officer : *Sandra Marshall*
STATUS : Planned
Division : Research Division
**** NEW PROJECT ****
AVAILABILITY : Publication is not available

HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

ENVIRONMENTAL IMPACT ASSESSMENT TOOLS FOR MULTI-UNIT HOUSING

This project will assess 6 different environmental assessment tools to determine their applicability to multi unit residential buildings. The best features and limitations of each tool will be identified and transmitted to the authors of each tool. Four innovative buildings will then be assessed by one of the tools. This work was presented to the Green Building Challenge '98 (GBC) Committee as part of CMHC's contribution to the development of the residential component of the Green Building Challenge overall evaluation criteria for buildings of all types. The GBC is an international conference on the performance assessment of buildings held in Vancouver October 1998. Further work will be done in 1999 to develop a comprehensive environmental impact assessment tool for highrise buildings, including the identification of related benchmarks, and the associated costs and savings from reducing environmental damage.

CMHC Project Officer : *Cate Soroczan*
CIDN : 1872 0200
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

EXPORTING CMHC'S TECHNICAL SEMINAR SERIES

Over the past fifteen years, CMHC has undertaken research work into the development of technologies for highrise buildings. The work could be marketable in the US and other countries where they are being faced with similar concerns regarding energy efficiency, airtightness, noise control and rain penetration control of the building envelope. CMHC's research activities into the building sciences were undertaken by Canadian consulting firms who have gained considerable knowledge that could also be marketed in other countries. A pilot series of seminars is being developed to be conducted in the USA in partnership with the Building Environmental Thermal Envelope Council with funding from the Dept. of Energy.

CMHC Project Officer : *Jacques Rousseau*
CIDN : 1928 0200
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

FINANCIAL CONTRIBUTION TOWARDS THE INTEGRATED DESIGN CHARETTES AT CONSTRUCT CANADA

The objective of this project is to prepare and deliver four parallel workshops, each to deal with integrated design process applicable to the following scenarios: a) a new mixed-use building, b) the renovation of a multi-unit residential building, c) the renovation/retrofit of a commercial building and d) the design of a large new institutional building.

CMHC Project Officer : *Sandra Marshall*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 0840 0306016
STATUS : Ongoing Project
**** NEW ****

GOVERNOR'S ROAD AND SPENCER CREEK VILLAGE PROJECT, DUNDAS, ONTARIO

The purpose of this project was to carry out the CMHC Healthy Housing and IDEAS Challenge objectives on the Governor's Road and Spencer Creek Village project in Dundas, Ontario.

CMHC Project Officer : *Sandra Marshall*
Division : Research Division
AVAILABILITY : Publication is not available

STATUS : Ongoing Project

GUIDELINES FOR THE RETROFIT OF UNINSULATED MASONRY WALLS

In cooperation with NRC's Institute for Research in Construction, a project has been initiated to assess common forms of solid masonry walls in commercial and residential buildings and current energy retrofit strategies. Investigations of previously retrofitted walls are being performed to determine the impact on the durability of the building envelope.

CMHC Project Officer : *Duncan Hill*
Division : Research Division
AVAILABILITY : Publication will not be published

CIDN : 1730 0300003
STATUS : Ongoing Project

HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

HIGH-RISE RENTAL RETROFIT COSTS AND IMPACTS

The recently completed assessment of repair needs for high-rise rental apartments in York and Toronto showed that about 9% of apartment buildings can expect very high repair costs. With the City of Toronto, this study would look at the problems faced by the owners and occupants of these buildings with high-cost-to-repair to determine the factors which have led to these incipient high repair costs and to propose possible avenues of resolution to these burdens. Examples of buildings which have had to deal with these problems will be sought as case studies. It is expected that the study will provide property managers with evaluation tools to improve their understanding of conflicting durability and financial constraints. The study is scheduled for completion by May 2000.

CMHC Project Officer : *Sandra Marshall*
Division : Research Division
AVAILABILITY : Publication is not available

STATUS : Planned
**** NEW PROJECT ****

HURON STREET DEVELOPMENT LIMITED PARTNERSHIP - 40 HURON STREET, VICTORIA, B.C.

This project's objective is to promote the IDEAS Challenge objectives; to critique the CMHC documents 'Brick Veneer Steel Stud Practice Guide on Building Technology' and 'The Design of Mechanical and Electrical Systems in Multi-Unit Residential Buildings'; and other tasks.

CMHC Project Officer : *Sandra Marshall*
Division : Research Division
AVAILABILITY : Publication is not available

STATUS : Planned
**** NEW PROJECT ****

IDEAS HIGH-RISE CHALLENGE

The IDEAS Challenge is intended to demonstrate the benefits of innovative design and technology in the operation of high-rise residential buildings. The Challenge focuses on five aspects of building design: envelope durability, energy efficiency, indoor air quality, environmental conservation and accessibility. One project in Montreal is built and monitoring is being carried out. Acoustic details have been tested. Two booklets are available, one that describes the IDEAS Challenge and the features of the five finalist projects and another which is a "Better Building" guide to innovation in the design and construction of high-rise residential buildings. The design process of a building in Dundas, Ontario which is exploring the adaptation of the IDEAS Challenge goals and details of CMHC's Best Practice Guide, is being documented. Projects in Vancouver and Edmonton are also ongoing.

CMHC Project Officer : *Sandra Marshall*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 0840 0300
STATUS : Ongoing Project

HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

MODELLING OF AIR/MOISTURE MOVEMENT AND DURABILITY PERFORMANCE OF RESIDENTIAL AND COMMERCIAL BUILDINGS

The purpose of this project is to develop knowledge to assess the impact of various wall designs, ventilation and indoor environment conditions on the durability and energy efficiency of new and retrofitted high-rise residential and commercial building systems.

CMHC Project Officer : *Duncan Hill*
CIDN : 1934 0200003
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

MONITORING INNOVATIVE MECHANICAL AND ELECTRICAL SYSTEMS

The innovative mechanical and electrical energy consuming and producing systems in high-rise housing at a recently completed housing project in Toronto, are being monitored. A gas-fired cogeneration system was installed that provides electricity and thermal heat to the building. The building's owners are concerned that the system is not performing in an economically viable manner. An extensive monitoring and performance assessment is underway to evaluate system performance. The cost of energy provided to the building by the cogeneration system in terms of fuel consumption, maintenance expenditures, avoided utility invoicing and other considerations will be assessed. The performance and cost of the cogeneration system will be compared to other alternative but more conventional options.

CMHC Project Officer : *Duncan Hill*
CIDN : 1260 0800001
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

MONITORING THE RETROFIT OF A RESIDENTIAL HIGH-RISE BUILDING ENVELOPE

A case study of a 20 year old high-rise building in Toronto has been undertaken to document and monitor the performance of the retrofitted walls. In November 1997, an Exterior Insulating Finish System (EIFS) was installed over the precast block walls as part of an overall building renewal project. Instrumentation to monitor heat, air and moisture regimes within the wall sections was installed which is currently being monitored for one year to assess the performance of the retrofit strategy. Preliminary results indicate that the walls are performing in a satisfactory manner but an assessment of the full year's monitoring will be necessary to draw conclusions concerning the retrofit measure.

CMHC Project Officer : *Duncan Hill*
CIDN : 1602 0200001
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

OPERATING AND MAINTENANCE BOOKS FOR MECHANICAL AND ELECTRICAL SYSTEMS IN MULTI-UNIT BUILDINGS

Two publications, currently in 'draft' stage, on improving the operating performance of modern residential building systems have been developed. The first document, for owners and managers, links good operating practices with desirable investment strategies. The second, for building operating and maintenance staff, updates information on mechanical and electrical systems and incorporates preventative maintenance checklists for multi-unit residential buildings.

CMHC Project Officer : *Jacques Rousseau* ***CIDN*** : 1774 0300004

Division : Research Division ***STATUS*** : Ongoing Project

AVAILABILITY : Publication is not available

PERFORMANCE MONITORING OF AN INNOVATIVE HIGH-RISE RESIDENTIAL BUILDING

A high-rise residential building is being constructed in Dundas, Ontario that will utilize many innovative design strategies, products and systems to improve durability, indoor environment, energy and water efficiency, resource use and environmental impact. In order to assess the cost-benefits of each measure, CMHC, in cooperation with Natural Resources Canada, will be undertaking and extensive year long monitoring program in the building. Energy and water consumption, building envelope, indoor air quality and ventilation system performance will be assessed in order to better understand the technologies adopted in the project. A report will be issued that describes the building project, the individual measures adopted to improve performance, and the impact on the overall performance of the building.

CMHC Project Officer : *Duncan Hill, Sandra Marshall* ***STATUS*** : *Ongoint Project*

Division : Research Division **** NEW ****

AVAILABILITY : Publication is not available

PERFORMANCE MONITORING: BRICK VENEER/STEEL STUD (BV/SS) WALL SYSTEM: PHASE 4

Phase 4 of this study involves a fourth year (1997/98) of in-situ performance monitoring of a BV/SS wall system, with respect to air and moisture movements after the top vents in the brick veneer wall have been opened. The performance of a wall is being monitored using temperature, moisture and air pressure sensors connected to an automatic data logging system. Preliminary results indicate that the vent holes did not contribute to drying the wall but increased the moisture loading of the brick veneer. Even though the BV/SS wall system is typical of current practices and workmanship was satisfactory, the results of the study demonstrate that performance problems exist that may lead to significant distress over the long term. The more serious performance problems identified in this study are due to design weakness demonstrating the need to improve design and construction standards. Phase 1 & 2 reports are available from CMHC. The results of the Phase 3 research demonstrated no significant difference from Phase 1 and 2 and the Phase 4 draft report has been received and is being revised.

CMHC Project Officer : *Jacques Rousseau* — ***CIDN*** : 0787 0300001
Division : Research Division — ***STATUS*** : Ongoing Project
AVAILABILITY : Publication is not available

QUALITY ASSURANCE PROTOCOL FOR WOOD FRAME BUILDING ENVELOPES IN BRITISH COLUMBIA

The purpose of this project is to demonstrate the Quality Assurance Protocol for Wood Frame Envelopes in BC. A consultant has been retained to work with Polygon Construction to implement the Quality Assurance Protocol.

CMHC Project Officer : *Jacques Rousseau* — ***CIDN*** : 1816 0300011
Division : Research Division — ***STATUS*** : Ongoing Project
AVAILABILITY : Publication is not available — **** NEW ****

RAIN PENETRATION CONTROL

This document, currently in the 'draft' stage, provides the latest information on controlling the penetration of rain into walls. It is based on CMHC's research and other information regarding rain penetration control. The work is being funded in collaboration with the American Architectural Manufacturers Association. A copy of the draft can be obtained from Jacques Rousseau.

CMHC Project Officer : *Jacques Rousseau* — ***CIDN*** : 1258 0300004
Division : Research Division — ***STATUS*** : Ongoing Project
AVAILABILITY : Publication is not available

HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

RAINSCREEN 2.1 COMPUTER PROGRAM

The RAINSCREEN program has been developed to assist in the design of rainscreen pressure equalized wall assemblies. A new version of the RAINSCREEN computer program, including a tutorial program and a manual that will be much more user-friendly has been produced and is available on the web at the following address:http://www.cmhc-schl.gc.ca/Research/HighRise/files/rainscreen.html

CMHC Project Officer : *Jacques Rousseau* ***CIDN*** : 1258 0300005

Division : Research Division ***STATUS*** : Ongoing Project

AVAILABILITY : Publication is not available

REMEDIATION OF MOISTURE TROUBLED WOOD FRAMED BUILDINGS IN THE COASTAL CLIMATE OF B.C.

This project will research and prepare diagnostics and recommended procedures for the cost effective remediation of leaking condominiums in the lower mainland of B.C. The project will develop a standard method of damage assessment, to develop a solutions tool which considers technical, code compliance, financial implications and practicality of repair. A document will also be prepared for property managers and for strata councils - on maintenance and repair issues. The project is nearly completed and the documents should be available by spring 2000.

CMHC Project Officer : *Ken Ruest, Mark Salerno* ***CIDN*** : 2061 0200

Division : Research Division ***STATUS*** : Ongoing Project

AVAILABILITY : Publication is not available

REPAIR AND RETROFIT CASE STUDIES FOR MULTI-UNIT RESIDENTIAL BUILDINGS

CMHC is documenting repair and retrofit activities in multi-unit residential buildings. The first 30 case studies will document building characteristics, the type of problems that prompted the repairs and retrofits, costs, benefits, etc. A wide range of case studies will be included to reflect regional repair and retrofit priorities. The studies will be useful for other members of the multi-unit residential building industry to refer to when considering similar projects. An information template that can be used as a guideline for the type of information that should be extracted from a repair or retrofit project in a multi-unit residential building has been developed. CMHC is currently soliciting the building industry for case studies and will retain consultants to provide the necessary documentation. A compendium of case studies will be assembled and made available.

CMHC Project Officer : *Luis de Miguel* ***CIDN*** : 1782 0300001-7

Division : Research Division ***STATUS*** : Ongoing Project

AVAILABILITY : Publication is not available

REVISION TO MONITORING PROTOCOL

The purpose of this project is to rewrite the protocol in a more modular fashion; expand the monitoring protocol to include monitoring, interpretation of data; remove the original reference to the IDEAS Challenge Project; and revise graph data presentation.

CMHC Project Officer : *Jacques Rousseau*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 0840 0306012
STATUS : Ongoing Project

TECHNICAL REVIEW OF CMHC PUBLICATION: MECHANICAL AND ELECTRICAL SYSTEMS IN APARTMENTS AND MULTI-SUITE APARTMENTS

The objective of this project was to carry out a final review of the CMHC Publication: Mechanical and Electrical Systems in Apartments and Multi-Suite Apartments. The review has been completed and the publication is in the process of being translated and printed.

CMHC Project Officer : *Duncan Hill*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1042 0200003
STATUS : Ongoing Project
**** NEW ****

TESTING OF DYNAMIC BUFFER ZONE (DBF) METHOD ON 312 CUMBERLAND STREET, OTTAWA

The purpose of this project is to test a Dynamic Buffer Zone (DBF) method in the air space behind the brick cladding on a building.

CMHC Project Officer : *Luis de Miguel*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 0411 0305002
STATUS : Ongoing Project

WIND-DRIVEN RAIN FOR THE GOVERNOR'S ROAD PROJECT

Continuing previous research, this project explores the impact of roof cornice design in providing protection from wind-driven rain at the top of a multi-family building in Dundas, Ontario in order to better optimize the roof design.

CMHC Project Officer : *Sandra Marshall*

CIDN : 1123 0300013

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

WOOD-FRAME ENVELOPES IN THE COASTAL CLIMATE OF BRITISH COLUMBIA. BEST PRACTICE GUIDE, BUILDING TECHNOLOGY

Building in BC's coastal climate has special challenges -- and this 256 page guide is the most up-to-date, authoritative information available to help meet those challenges. This guide provides the most comprehensive technical information on how to build to withstand the conditions of BC's coastal climate.

The guide is intended to provide guidance, primarily to designers, for the design of the building envelopes of multi-unit wood-frame buildings in the coastal climate zone of British Columbia. The guide should also be useful to the construction industry in general, encouraging an understanding of the behaviour and performance of building envelope assemblies. Much of the material in the guide may also be applicable to other climate zones and building types.

Although the guide is intended to reflect good practice in general, its primary focus is on the management of moisture, since moisture-related performance problems prompted this initiative. The guide therefore does not deal specifically with structural, acoustic or fire and safety issues that may also have an impact on the design of the building envelope.

The information in the guide includes behaviour of wood in construction, moisture source control strategies, heat flow mechanisms, typical envelope assembly characteristics, and materials for inclusion in specifications, quality assurance strategies, maintenance and renewal strategies and more than fifty-three state-of-the-art CAD details showing several air barrier strategies, all included on the companion CD-ROM.

Endorsed by the Canadian Wood Council (CWC) and the Building Envelope Research Consortium (BERC).

Prepared by RDH Building Engineering Limited in joint venture with Morrison Hershfield Limited. The two dimensional drawings were prepared by Hewitt Tan Kwasnicky Architects Inc. and the chapter on Behaviour of Wood was prepared by Don Onysko. Ottawa: Canada Mortgage and Housing Corporation, 1999.

Order number: NE2178 **Price: $89.00 + GST and handling charges.

STATUS : Completed Report

AVAILABILITY : CMHC Information Products
P.O. Box 35005
Stn BRM B
Toronto, Ontario M7Y 6E5
1-800-668-2642
Fax orders from Canada: 1-800-245-9274
International clients see page 9 for order instructions.

WOOD FRAME ENVELOPES. BEST PRACTICE GUIDE, BUILDING TECHNOLOGY

Designer, builders, building owners and managers who consult this guide should gain a general understanding of the principles and practical considerations of designing and constructing wood frame envelopes. The Guide emphasizes the best residential construction practice details and specifications used in design offices and on construction sites across Canada.

The information includes the behaviour of wood in construction, moisture control strategies, heat flow mechanisms, typical envelope assembly characteristics, components and materials for inclusion in specifications, quality assurance, maintenance and renewal strategies. More than 30 clearly drawn construction details on CD-ROM are easy to download into a CAD program. Metric and imperial measures, French and English in different layers.

Prepared for Canada Mortgage and Housing Corporation by Otto Bryden Erskine Martel Architects Inc., and subsequently by Otto and Erskine Architects Inc., in joint venture with Halsall Associates. The National Research Council of Canada, the Canadian Home Builders' Association, the Canadian Wood Council and the New Brunswick Home Builders' Association assisted in development of this book. Ottawa: Canada Mortgage and Housing Corporation, 1999.

Order number: NE6921 **Price: $89.00 + CST and handling charges.

STATUS : Completed Report

AVAILABILITY : CMHC Information Products
P.O. Box 35005
Stn BRM B
Toronto, Ontario M7Y 6E5
1-800-668-2642
Fax orders from Canada: 1-800-245-9274
International clients see page 9 for order instructions.

ABOUT YOUR HOUSE 'LOG HOMES'

The object of this project is to draft an 'About Your House' document on Log Homes. The document will describe logistics, benefits, and new technologies in log home construction.

CMHC Project Officer : *Don Fugler*

Division : Research Division

CIDN : 1584 0300006

STATUS : Completed

APPLICATION OF STRUCTURAL STEEL TO SINGLE-FAMILY RESIDENTIAL CONSTRUCTION

This study is an investigation of the use of structural steel in single-family residential construction, and an analysis of its applicability to Canada, taking into account technical requirements, cost-effectiveness, and sustainability.

With the rise of housing costs, global competition, and increasing environmental concerns, new systems and innovative uses of material are required to supplement the existing construction methods. Numerous studies have demonstrated the potential of steel for building and its advantage in terms of price, performance, and physical properties. Residential projects in steel are usually built with lightweight metal framing systems. Structural steel is seldom used, although it offers additional advantages in terms of performance, economy, flexibility, and speed of construction, as well as a wide availability of skills, trades, and experience from the commercial and industrial building sector.

The purpose of the study is to provide to decision-makers in the building industry a clear view of the possibilities offered by the application of structural steel to housing.

The 200-page report addresses the following topics:

- steel and metal building systems in the context of housing;
- existing steel houses worldwide and in Canada;
- source of information for steel technology;
- compliance with building codes;
- Canadian steel suppliers and trades;
- prototype design of a steel house;
- steel house and sustainability.

Prepared by Michel de Spot, Node Engineering Corp. CMHC Project Officer: Rob Duncan. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

BUILDER'S WORKSHOP SERIES TRAINER'S MANUAL

The objective of this project was to revise and update the three remaining modules for inclusion in the Builder's Workshop Series Trainer's Manual, (i.e. Indoor Air Quality, Ventilation and Noise Control). The first four modules: Foundations, Wall Assemblies, Floor Assemblies, and Roof and Ceiling Assemblies have already been updated and are now in publishing phase. The IAQ, Ventilation and Noise Control training modules will be updated to coincide with the applicable information in "Building Solutions: A Problem Solving Guide for Builders and Renovators" and with current building codes and practices. These modules will be developed for presentation as two to three hour workshops, suitable for delivery at builder forums.

CMHC Project Officer : *Darrel Smith*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2130 0200001
STATUS : Ongoing Project

CD-ROM VERSION OF THE CANADIAN WOOD-FRAME HOUSE CONSTRUCTION

The purpose of this project is to design and develop an internet based CD-ROM version of CMHC's "Canadian Wood-Frame House Construction" publication complete with a number of multimedia enhancements. It will also include the "Glossary of Housing Terms" with links from "CanadianWood-FrameHouse Construction", to serve as an illustrated glossary. It is anticipated to be available by mid 2000.

CMHC Project Officer : *Darrel Smith*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2123 0200001
STATUS : Ongoing Project

COMPARATIVE STUDY OF ALTERNATIVE FRAMING AND BUILDING SYSTEMS FOR LOW-RISE HOUSING

The purpose of this study is to compare the various alternative framing and building systems for low-rise housing in use today. These may include but not be limited to insulating concrete forms, straw bale, structural insulated panels, stack wall log and steel. The results of this study will be beneficial to those in the industry to help them make better informed decisions on choice of framing and building systems. This study will take an inventory of and investigate the differences, benefits and limitations of the common and innovative building systems which are currently in use as compared to the typical wood-frame, stick-built construction of low-rise housing. It will consider the advantages and/or disadvantages of the various systems for use in remote areas as well as the potential for exporting to other countries. The study will examine all of the factors to be considered by a builder or homeowner to help them understand the differences between the available system choices so they may evaluate and select systems appropriate to their clients, house designs, trade practices and skills, and regions.

CMHC Project Officer : *Darrel Smith*

CIDN : 2119 0200001

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

COMPREHENSIVE ANALYSIS OF SELF-BUILD HOUSING EXPERIENCES

The objective of this report is the development of a comprehensive analytical framework to evaluate self-build experience both in Canada and abroad and to determine the potential transferability of international initiatives to the Canadian context. The mandate was to develop a practical tool for the comparative analysis of self-build initiatives, a tool which could identify the major factors that contribute to the success or failure of any given initiative. The focus of the self-build initiatives chosen for analysis is primarily on urban multi-family and rehabilitation examples.

Six categories were selected for use in the analytical framework as a method of classifying the factors that are essential to the success of an evaluated self-build initiative. These categories are: organization; financing; design; construction; post-occupancy; and institutional context.

Chapter 1 of the report defines self-build, differentiating it from the concept of self-provision and from the broader context of self-help. The second chapter outlines the numerous issues relevant to a discussion of self-build and provides a justification for the selection of the six categories used in the evaluative framework. The analytical framework itself is then described: the Stage 1 level of analysis which proceeds by submitting a chosen self-build initiative to a series of 30 critical questions, and the Stage 2 level of analysis which provides a more detailed evaluation by submitting a selected initiative to a total of 146 questions. A brief description is provided for each of the 30 critical questions, and the 146 detailed evaluation questions are listed.

The third chapter presents a profile of the 30 self-build initiatives that were analyzed according to the Stage 1 and Stage 2 levels of analysis.

Conclusions are presented in the fourth chapter, followed by a complete bibliography. The appendices to the report include a guidebook to the analytical framework to help the user identify either key positive factors or weaknesses/failings in an examined initiative and to receive advice or guidance for further consideration in terms of the initiative's validity and its applicability to the Canadian context.

Prepared by Avi Friedman, Steve Pomeroy, David Krawitz, and Alexander Smith. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: David Scherlowski. Ottawa: CMHC, 1999. (Housing Affordability and Finance Series Research Report)

Order number: PE0357 ** Price: $12.95 + GST and handling charges.

STATUS : New Completed Report

AVAILABILITY : CMHC Information Products
P.O. Box 35005
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CONTRACTOR TRAINING COURSE ON THE CONSTRUCTION AND RESTORATION OF DURABLE BUILDING ENVELOPES FOR RESIDENTIAL WOOD-FRAME BUILDINGS LOCATED IN THE LOWER MAINLAND OF BC AND VANCOUVER ISLAND

This is a partnership project between the Canadian Home Builder's Association of British Columbia (CHBA/BC), the Home Owner Protection Office (HPO) of B.C. and CMHC. The purpose of the project is to develop and pilot a course curriculum and course training materials to train general contractors and subtrades in building construction practices that would enable them to construct highly durable building envelopes for new residential wood-frame buildings located in the lower mainland of British Columbia and Vancouver Island and to restore and upgrade the envelopes of existing buildings. The course will be tailored to meet the needs of the residential construction industry and would use a full range of teaching methods to ensure that all participants absorb the information provided. The project is expected to be complete by July 2000.

CMHC Project Officer : *Darrel Smith, Mark Salerno*

Division : Research Division

AVAILABILITY : Publication is not available

STATUS : Planned

**** NEW PROJECT ****

CSA Z-824 STANDARD

The objective of this project is to take the existing draft of the CSA Z-824 Log Standard, rationalize the organization of the standard contents, and produce a draft for comment.

CMHC Project Officer : *Rob Duncan*
CIDN : 1811 0300001
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

DEVELOPMENT OF COMMERCIALLY VIABLE CONCEPTS AND A DESIGN FOR A RESIDENTIAL FRAMING SYSTEM FOR A MONOCOQUE HOUSE

The purpose of this project is to undertake the development of commercially viable concepts and a design for a residential framing system for a monocoque house, to provide on-site guidance during the construction of prototypes of the design and to undertake post construction performance monitoring of the structures.

CMHC Project Officer : *Rob Duncan*
CIDN : 0657 0300001
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

DEVELOPMENT OF GENERIC ENGINEERED DETAILS FOR THE CONSTRUCTION OF RESIDENTIAL TALL WALLS

Part 9 of the Alberta Building Code (1997) defines maximum allowable heights for exterior loadbearing walls based on their physical characteristics and the loads they support. The code, however, only specifies requirements for walls up to approximately 12 feet in height. Walls exceeding that height must be individually engineered. Significant time and expense could be saved through the availability of generic, engineered data which would allow builders in Alberta to select appropriate material and installation configurations for the tall wall requirements incorporated in their various projects. The purpose of this project was to develop such data.

Several general configurations were identified for analysis. These configurations included both solid walls and walls with varying window layouts. The range of wall dimensions was 7 to 16 feet in width by 10 to 20 feet in height. Some appurtenant components generally thought to provide additional support for tall walls were also included in the analysis. These included horizontal feature shelves, fireplaces located in corners and intra-span, interior partitions, and hip roofs.

Developmental work followed generally accepted principles of limit states design. Load carrying capacity and lateral deflection were defined as the governing limit states. The general design philosophy encompassed examination and classification of live loads throughout the province, and development of tables that link the load classification at a particular location to allowable tall wall characteristics for that location.

Two types of tall walls were developed. The first case - tables which identify the maximum widths of loadbearing walls of given height - was chosen as a means of addressing the option to construct tall walls in two vertical lifts. The second case - tables that identify the maximum height to which a loadbearing wall may be built - addresses the option of building tall walls with full height stud members. In the first case, stress and deflection due to wind loads constituted the governing conditions. Allowable deflection was set at 1/180 of the width of the wall. In the second case, the combination of axial loading and bending moments caused by wind loading was considered, and either stresses or deflections governed the allowable height of the wall, depending on load combination.

The structural contributions of the appurtenant components studied were found to be minimal. From the generic perspective, whatever contributions could be afforded by these items would be lost to design allowances that would have to be made to compensate for the large number of variables associated with their installation. These variables include vertical and horizontal positions on the wall, materials used, and fastening methods used. Details describing these items would have to be intricate and the potential for another field variable - misapplication of intended specifications - would likely be introduced.

The tables developed within the scope of this project allow extension of the existing limits of the Alberta Building Code, 1997 edition. Table 9.23.10.1 of the code allows walls up to approximately 12 feet in height to be built without professional design input. Properly utilized, these tables allow the construction of walls up to approximately 25 feet in height (dependent upon load conditions) to be built in Alberta without professional design input. Some situations will exist where the tables do not address the requirements of a particular project or a particular project cannot comply with the conditions accompanying the use of the tables, and in these circumstances, individual professional design will remain a requirement.

Prepared by Campbell Woodall & Associates Consulting Engineers Ltd. CMHC Project Manager: Darrel R. Smith. Prepared for Research Division, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1999.

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre

Canada Mortgage and Housing Corporation

700 Montreal Road

Ottawa, Ontario

K1A 0P7

Tel.: 613-748-2367 or 1-800-668-2642

Fax.: 613-748-4069

Email: chic@cmhc-schl.gc.ca

International clients see page 9 for order instructions.

DIE KANADISCHE HOLZRAHMENBAUWEISE and FACHAUSDRÜCKE IM HÄUSERBAU

This kit includes the German language versions of the "Canadian Wood-Frame House Construction" and "Glossary of Housing Terms" for $29.95.

"Canadian Wood-Frame House Construction" is the 'bible' on building wood-frame houses in Canada. A step-by-step guide from excavation to the finishing touches, this ideal learning tool and essential job-site reference is indispensable for builders, renovators, students and do-it-yourselfers. Updated to conform to Canada's National Building Code requirements, it includes new illustrations and handy sizing tables; metric and imperial measurements; Planning ahead and Checking Back notes; plus healthy housing tips to improve indoor air quality and minimize environmental impacts.

"Glossary of Housing Terms" is an A-to-Z of housing terms! This thoroughly revised, comprehensive dictionary lists more than 1,200 housing definitions. Canada's authoritative reference book for builders, students and the informed homeowner for more than 30 years.

Ottawa: Canada Mortgage and Housing Corporation, 1999.

Order number: NG2420 **Price: $29.95 + GST and handling charges.

NOTE: Also available in English, French and Russian editions.

STATUS : New Completed Report

AVAILABILITY : This package deal will be available for sale at the price of $29.95 through our 1-800-668-2642 in Canada. For international clients please call (613) 748-2003; credit card only orders will be accepted.

EASY-ACCESS THRESHOLDS TO BALCONIES: PROBLEMS AND POSSIBLE SOLUTIONS

The objective of this project is to demonstrate to architects, builders, developers and regulatory agencies the possibilities of producing easy-access thresholds to balconies in new or renovated residential buildings.

CMHC Project Officer : *Sandra Marshall*

Division : External Research Program
Research Division

AVAILABILITY : Publication is not available

CIDN : 1995 0200001

STATUS : Ongoing Project

RESIDENTIAL DECONSTRUCTION MANUAL

The intent of this manual is to provide project managers (architects, engineers, interior designers, associated technicians and technologists, contract administrators, contractors, and site supervisors) involved in residential (single family and multi-unit) demolition with a reference tool to assist them in the economic feasibility assessment, planning and supervision of deconstruction.

Prepared by Derek Badger. CMHC Project Manager: Darrel R. Smith. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

STROITEL 'STVO DEREVYANNYKH KARKASNYKH DOMOV V KANADE and GLOSSARIY TERMINOV PO ZHILISHCHNOMU STROITEL' STVU

This kit includes the Russian language versions of the "Canadian Wood-Frame House Construction" and "Glossary of Housing Terms" for $29.95.

"Canadian Wood-Frame House Construction" is the 'bible' on building wood-frame houses in Canada. A step-by-step guide from excavation to the finishing touches, this ideal learning tool and essential job-site reference is indispensable for builders, renovators, students and do-it-yourselfers. Updated to conform to Canada's National Building Code requirements, it includes new illustrations and handy sizing tables; metric and imperial measurements; Planning ahead and Checking Back notes; plus healthy housing tips to improve indoor air quality and minimize environmental impacts.

"Glossary of Housing Terms" is an A-to-Z of housing terms! This thoroughly revised, comprehensive dictionary lists more than 1,200 housing definitions. Canada's authoritative reference book for builders, students and the informed homeowner for more than 30 years.

Ottawa: Canada Mortgage and Housing Corporation, 1999.

Order number: NR2421 **Price: $29.95 + GST and handling charges.

NOTE: Also available in English, French, and German.

STATUS : New Completed Report

AVAILABILITY : This package deal will be available for sale at the price of $29.95 through our 1-800-668-2642 in Canada. For international clients please call (613) 748-2003; credit card only orders will be accepted.

TRANSLATION OF CANADIAN WOOD FRAME HOUSE CONSTRUCTION HANDBOOK 1998 AND THE GLOSSARY OF HOUSING TERMS 1997 REVISED EDITION INTO SPANISH

The purpose of this project is to translate the Canadian Wood Frame House Construction Handbook 1998 and the Glossary of Housing Terms 1997 revised edition into Spanish.

CMHC Project Officer : *Louis Musto*

CIDN : 1973 0900002

Division : Canadian Housing Export Centre

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

USE OF CONVENTIONAL CROSS BRIDGING IN WOOD-I-JOIST FLOORS

The use of cross bridging in improving performance and load-carrying capacities of conventional sawn lumber joist floors is well known. With the rapid substitution of solid sawn joists by prefabricated wood I-joists and the tendency of builders to adopt conventional construction techniques for this relatively new product, there is need to evaluate if the same type of bridging can be used equally effectively for floors built with wood I-joists. This study was conducted to answer this question.

A total of eight full-size floor systems were tested in this study for their deflection and vibrational characteristics. In addition, four narrow floor specimens were tested to evaluate the impact of omitted bridging members on failure load and mode of floors. These test systems were built with 302mm (11 7/8") deep wood I-joists and an oriented strandboard floor sheathing. Construction details followed largely National Building Code requirements. In addition to the major objective of finding out if cross bridging can be similarly adopted for floors with wood I-joists, the experimental program was designed to evaluate the influence of parameters on the effectiveness of cross bridging. These parameters included joist spacing, number of rows of bridging and lumber strapping.

It was found that deflection and vibration levels decreased with the addition of bridging. Bridging was more effective in floors with close joist spacing than wide joist spacing. Increasing the number of rows of bridging from one to two (equally spaced) led to a large reduction in floor deflection but only a relatively small reduction in vibration levels. A large synergistic influence was achieved when a bottom lumber strapping was used in conjunction with cross bridging. This effect was particularly profound for systems with wide joist spacing. The current requirement of using two 57 mm (2 1/4,") nails at each end of a cross bridging member was found to be adequate if properly installed. Any weak fastening or omitted bridging member may lead to a large reduction in load-carrying capacities of floors, compared with properly fastened systems. The use of bottom strapping in conjunction with cross bridging, can however minimize this reduction.

Prepared by Y.H. Chui, Wood Science and Technology Centre, University of New Brunswick. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

TECHNOLOGY DISSEMINATION - A NEW APPROACH

Despite significant national efforts, the Canadian residential construction industry is often resistant to the introduction of cost saving technologies, due in part to most contractors having limited abilities to research, evaluate and introduce such advances. The goal of this External Research Program work is to devise an information dissemination technique which focuses on the process of innovation introduction rather than the innovations themselves. It is felt that by "reasonably demonstrating" the value of various innovations to subcontractors, there will subsequently be a "natural" spread to other projects as the subcontractors utilize their newly acquired cost-effective techniques to gain a competitive advantage. This project report will be of interest to researchers, builders and developers who desire to integrate new and improved building process onto the mainstream of the construction industry.

HOUSE CONSTRUCTION INDUSTRY

CMHC Project Officer : *Thomas Green*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2144 0200016
STATUS : Ongoing Project

HOUSING DESIGN

APPLICATION OF VIRTUAL REALITY TECHNOLOGY TO THE FLEXHOUSING DESIGN COMPETITION 2 & 3

The objective of this project is to prepare a professional quality interactive multi-media presentation (including introduction, scripting, OTVR movies, renderings, music and/or voice-over, etc.) for each FlexHousing design in a master copy electronic format and CD-ROM.

CMHC Project Officer : *Tom Parker*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1586 0200002
STATUS : Ongoing Project
**** NEW ****

FLEXHOUSING DESIGN DEMONSTRATION

CMHC's FlexHousing is a new and innovative approach to home design, renovation and construction, able to adapt and convert affordably as people's lifestyles change. This exciting and practical approach to designing and building housing of all kinds - from single family, duplexes, multi-unit and even apartments allows residents to convert space to meet their changing needs. A 1996 CMHC design competition has spawned open houses of the winning designs and publications.

The Canadian Centre for Housing Technology at the National Research Council features the winning FlexHouse design in its Information Centre, opened in October 1999. More information is available on the CMHC Home page or in the new publication "FlexHousing - Homes That Adapt to Life's Changes."

CMHC Project Officer : *Tom Parker*
Division : Research Division

CIDN : 1389 0300
STATUS : Ongoing Project

FLEXHOUSING INFORMATION FOR THE CANADIAN HOME BUILDING INDUSTRY

To develop information materials and activities to encourage understanding and uptake of FlexHousing principles by the homebuilding industry. A "Professionals' Guide to FlexHousing" will be produced in fall 1999. A professionals' seminar will be developed to complement this information. FlexHousing displays at home shows will be undertaken, as well as work with selected municipalities on model bylaws to facilitate FlexHousing adoption.

CMHC Project Officer : *Tom Parker*

CIDN : 2144 0200011

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

FLEXHOUSING: HOMES THAT ADAPT TO LIFE'S CHANGES

FlexHousing in CMHC's answer to housing design that meets the changing needs of the occupant. This publication explains the key principles of FlexHousing essentially housing design that is adaptable, accessible and affordable.

This is a visually dynamic and attractive publication that features winning designs from CMHC's FlexHousing competition as well as examples of adaptable housing from around the world. The publication also includes information on FlexHousing systems and materials, costs and checklists. Sample floor plans are provided for many housing types including: singles, duplexes and multi-units.

This publication is suitable for consumers who are making a housing purchase decision as well as housing design and construction professionals.

Ottawa: Canada Mortgage and Housing Corporation, 1999. 72 pages.

Order number: NE2020 **Price: $9.95 + GST and handling charges.

STATUS : New Completed Report

AVAILABILITY : CMHC Information products
P.O. Box 35005
Stn BRM B
Toronto, Ontario M7Y 6E5
1-800-668-2642
Fax orders from Canada: 1-800-245-9274
International clients see page 9 for order instructions.

MONTRÉAL: A GREAT TRADITION OF MEDIUM-DENSITY HOUSING

This project aims to highlight the adaptation processes of housing and building types throughout the various phases of the evolution of "plex" formulas (duplex, triplex, fourplex, fiveplex ...) in Montreal over four construction cycles betwwn 1866 and 1935.

CMHC Project Officer : *Mark Holzman*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 1455 0200001
STATUS : Ongoing Project

PASSIVE SOLAR HOUSE DESIGN PILOT WORKSHOP

In partnership with the Solar Energy Society of Canada (SESCI), and with support from NRCan, this project will assist SESCI to develop and present a pilot workshop on passive solar house design in 2000. The content of the workshop will be based primarily on the CMHC TAP the SUN publication. The pilot workshop will provide experience and feedback for the possible future development of a series of passive solar design workshops for presentation across Canada. The workshop is targeted to designers, builders and developers who want to include renewable energy approaches in their housing projects to create more energy efficient housing, more comfortable interior spaces, and reduce green house gas production from the housing sector.

CMHC Project Officer : *Thomas Green*
Division : Research Division
AVAILABILITY : Publication will not be published

CIDN : 2200 0200002
STATUS : Ongoing Project

PLEX RENOUVELÉ

This research report focuses on the Plex as an affordable and sustainable housing form. It traces its evolution and documents several historical types of it. The report appraises the Plex's advantages and proposes several design alternatives that would adapt it to the needs of contemporary households. The adapted Plex emerges as a flexible and economic form of housing most suitable for meeting the need for affordable housing. It is also an ideal form for infill and for more compact new neighbourhoods.

CMHC Project Officer : *Fanis Grammenos*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2096 0200001
STATUS : Ongoing Project

HOUSING DESIGN

SINGLES HOUSING DESIGN STUDY AND DESIGN CHARETTE

A precedent study to review and evaluate existing singles housing design projects in Canada and the United States, and to identify the legislative barriers to developing new singles/SRO housing in Toronto. A design charette to generate detailed unit and building designs.

CMHC Project Officer : *Anna Lenk*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2183 0200001
STATUS : Ongoing Project

INDOOR ENVIRONMENT

DEFINING THE CONVECTIVE DRIVING FORCE FOR SOIL GAS INTRUSION INTO HOUSES

This External Research study is an evaluation of soil gas pressures surrounding building envelopes, taking into account the role of geologic variability, surface coverings, and other environmental factors. The data from this study will be used to predict soil gas flux into houses and assess its impact to indoor air quality.

CMHC Project Officer : *Don Fugler*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 1826 0200001
STATUS : Ongoing Project
**** NEW ****

DEVELOPING MATERIAL EMISSIONS STANDARDS FOR ASTM APPROVAL

This project is providing support for the development of two ASTM standards on materials emissions "Standard Practice for Determination of Volatile Organic Chemical Emission Factors Using Small Environmental Chambers Under Defined Conditions." One of these standards will be for evaluating emissions factors from "Caulk and Sealant Products," and the other will be for "Spray-Applied Polyurethane Cellular Plastic Thermal Insulation." Both of these standards have been drafted and are currently out for balloting by the ASTM sub-committee.

CMHC Project Officer : *Ken Ruest*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1244 0201011
STATUS : Ongoing Project
**** NEW ****

DEVELOPMENT OF A TEACHING MODULE ON INDOOR AIR QUALITY FOR PHYSICIANS

The Ontario College of Family Physicians, in collaboration with and funding from CMHC, is developing a teaching module on Indoor Air Quality which will form part of the curriculum in Environmental Health in Family Medicine. Dr. Alan Abelsohn, the project leader, will pilot the module at a peer workshop for family physicians in Ontario in spring 2000 The participants of this workshop will in turn deliver the module in their respective communities. The module will also be presented at the teaching universities in Ontario. Distribution of the module in other provinces will also be explored. This project is an attempt to transfer housing information to consumers through health professionals. Physicians are in a unique position of authority and are the most suitable for communicating housing information and the health impacts of good indoor air quality.

CMHC Project Officer : *Virginia Salares*
CIDN : 2128 0200001
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available
**** NEW ****

DEVELOPMENT OF MATERIAL EMISSION TEST STANDARDS

Improved test standards for emissions from caulks and sealants and urethane foam are currently being developed. These standards, currently in draft, are now being considered within the American Society for Testing and Materials (ASTM) process. NRC/IRC has developed a draft emission test standard for VOCs from pressed wood products. Revisions are being made to these draft standards in response to an ASTM committee ballot and will be resubmitted again this year, using new CMHC support funding, as requested by the Task Force on Material Emissions. It is anticipated that the ballot will be passed for inclusion of these standards into the ASTM process.

CMHC Project Officer : *Virginia Salares*
CIDN : 1244 0201003
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

EFFECT OF IMPROVING THE HOME ENVIRONMENT ON ASTHMA: A PILOT STUDY

Six houses having one or more individuals suffering from asthma and in which the occupant's symptoms are linked to the house were inspected following the CMHC Residential IAQ Investigation Protocol. All houses were found to be severely moldy. The houses were subjected to tests for various indoor air parameters - CO2, VOC's, dust mite allergens and molds. Mold tests confirmed the inspection findings. Five of the homeowners proceeded with a remediation. Compliance with recommendations of the study varied from partial to full. The health status of the asthmatic occupants was monitored during the study. Health improvement of the occupants correlated qualitatively with the degree of improvement of the air quality of the houses.

Prepared by Buchan, Lawton, Parent Ltd. CMHC Project Officer : Virginia Salares. Ottawa: Canada Mortgage and Housing Corporation, 1998, c1999. (Housing Technology Series)

Order number: PE0362 ** Price: $12.95 + GST and handling charges.

STATUS : New Completed Report

AVAILABILITY : CMHC Information Products
P.O. Box 35005
Stn BRM B
Toronto, Ontario M7Y 6E5
1-800-668-2642
Fax orders from Canada: 1-800-245-9274
International clients see page 9 for order instructions.

FIELD VALIDATION OF AN IAQ MODEL FOR PREDICTING THE IMPACT OF MATERIAL EMISSIONS ON THE INDOOR AIR QUALITY OF A NEWLY CONSTRUCTED HOUSE

The National Research Council's Institute for Research in Construction has developed a model to predict the impact of emissions of building materials on the indoor air quality of a newly constructed house. Measurements of indoor air parameters were carried out at the 'reference' house, a newly constructed house at the NRC campus. The construction of this house is typical of currently built houses. The field measurements will be compared with the predictions of the model. All measurements have been completed and are being analyzed. The results would determine whether the model has future applicability for predicting the indoor air quality of a house by means of data on the types and quantities of materials and ventilation characteristics of the house.

CMHC Project Officer : *Virginia Salares*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2110 0200001
STATUS : Ongoing Project

GUIDE TO MECHANICAL EQUIPMENT FOR CLEAN INDOOR ENVIRONMENTS

Complementing the "Building Materials for the Environmentally Hypersensitive", this publication deals with heating, ventilating, air and water purification equipment for housing requiring special attention to air quality. The document is a reference guide for selecting new mechanical equipment for new construction or retrofits. The document includes discussions of the applicability of the equipment to environmentally hypersensitive individuals. The guide will be available in winter 2000.

CMHC Project Officer : *Virginia Salares* — ***CIDN*** : 1031 0200001

Division : Research Division — ***STATUS*** : Ongoing Project

AVAILABILITY : Publication is not available

INDOOR AIR POLLUTION FROM ATTACHED GARAGES

CMHC is contributing to a Health Canada/Environment Canada project investigating the infiltration of garage-based pollutants into houses. Twenty-five Ottawa houses have been tested to determine the leakage area between the house and the attached garage. Pressure differentials were recorded and pressure testing was repeated during the winter months. The current work includes modeling of the IAQ implications and monitoring of pollutant entry when the garage is occupied by a "calibrated" car. So far, modeling has not been very successful. Further field testing took place in the winter of 1998/99. Health Canada will be publishing the project reports.

CMHC Project Officer : *Don Fugler* — ***CIDN*** : 1910 0200002

Division : Research Division — ***STATUS*** : Ongoing Project

AVAILABILITY : Publication is not available

INDOOR AIR QUALITY TRAINING IN FIRST NATIONS COMMUNITIES

The objective of this project is to provide First Nations people with the capability to deal with mold and other indoor air quality problems in their communities. Working with First Nations, CMHC's existing training initiatives have been modified for First Nations use. An Advisory Group consisting of First Nations technical and health representatives was formed to advise CMHC on the delivery and implementation of the training. The Advisory Group meets or communicates on a regular basis to discuss modifications of the training programs, scheduling and delivery of courses as well as issues dealing with funding.

CMHC Project Officer : *Virginia Salares* — ***CIDN*** : 2208 0200001

Division : Research Division — ***STATUS*** : Ongoing Project

AVAILABILITY : Publication will not be published — **** NEW ****

INDOOR AIR QUALITY TRAINING PROGRAM

CMHC's Residential Indoor Air Quality IAQ) Investigator Program exists to train qualified individuals to investigate homes for indoor air problems. Individuals who complete the program acquire the skills to inspect homes for IAQ problems and to provide informed advice to homeowners on how to correct these problems. They offer their professional services to the public for a fee. Individuals interested in the program can contact the program coordinator (e-mail: joolsdev@mv.igs.net, telephone 613 756-0714) for admission requirements and application forms. The program will continue in year 2000. Ninety five individuals from six regions have participated in the training since 1998. For referral purposes, a list of individuals who have completed or are completing the training is available from CMHC offices.

CMHC Project Officer : *Virginia Salares*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN : 1623 0300017

STATUS : Ongoing Project

PRINCE EDWARD ISLAND BIRTH COHORT STUDY OF MOLD IN HOMES

This joint study between CMHC, Carleton University, Health Canada and others will ultimately look at several hundred homes in Prince Edward Island to determine the biological exposure, house performance parameters and energy use characteristics of a statistically-representative set of houses occupied by newborn babies. Part of the study will follow the health of these babies to determine the degree to which damp and moldy houses result in increased infant health problems. The second year of the study has been completed. Testing in additional houses for the third year of the project will be undetaken in early 2000. Data is being analyzed.

CMHC Project Officer : *Ken Ruest*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN : 1618 0300001-2

STATUS : Ongoing Project

INDOOR ENVIRONMENT

RESEARCH CHAIR IN HEALTH AND INDOOR AIR QUALITY - CARLETON UNIVERSITY

CMHC is participating in an Industrial Research Chair in Health and Indoor Air Quality at Carleton University. The principal funding for this Chair is being provided by the Natural Sciences and Engineering Research Council (NSERC), with contributions from Paracel Laboratories Ltd., Health Canada, Kingston General Hospital, Carleton University and CMHC. The Chair, in collaboration with its partners, will develop more rapid and cost effective methods for measuring the types and amount of mold in buildings and exposures of the occupants, construct a database of cultures of molds found in moisture troubled buildings, prepare purified extracts of the molds for allergy diagnostic tests and undertake studies of the effects of these molds on lung cells. The output from this Chair would have far-reaching benefits for the general population in the clinical diagnosis of mold allergy and the mitigation of mold contaminated buildings. A five year research program of the Chair is planned, beginning in January 2000.

CMHC Project Officer : *Virginia Salares*
Division : Research Division
AVAILABILITY : Publication is not available

STATUS : Planned
**** NEW PROJECT ****

STUDY OF HOUSE RETURN AIR SYSTEMS USING FLOOR JOIST SPACES

Research was conducted on air in houses that is distributed through the ducting system consisting of supply ducts and a return air plenum. Floor joist spaces are being used as return plenums in new construction and this study characterizes the indoor air in a number of houses with return air plenums made of all metal, combinations of metal, solid wood, plywood or oriented strand board. A Research Highlight sheet is being prepared.

CMHC Project Officer : *Virginia Salares*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1704 0300001
STATUS : Ongoing Project

SUPPORT FOR THE CONSORTIUM FOR MATERIAL EMISSIONS AND INDOOR AIR QUALITY MODELING

CMHC is an active supporting member on the steering committee and technical committee of a consortium established by the National Research Council, Institute for Research in Construction to develop protocols for testing materials and furnishings and for modeling the impact of those emissions on indoor air quality. Funds are being used to increase the database of materials tested to the new standards, in a house being built on the NRC campus.

CMHC Project Officer : *Virginia Salares*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1244 0200004
STATUS : Ongoing Project

INDOOR ENVIRONMENT

TOWARD THE USE OF VOLUNTARY INITIATIVES FOR ACHIEVING HEALTHY INDOOR ENVIRONMENTS IN CANADA

CMHC is participating in this partnership initiative developed and led by Pollution Probe. The objective of this project is to establish the current state of regulation of the indoor environment - residential, commercial and institutional - in Canada and to identify barriers and approaches to enabling the promotion and achievement of healthy indoor environments. The project will review and analyse existing regulatory and voluntary programs which have an impact on the indoor environment, both in Canada and internationally. The project scope will cover four distinct areas - buildings, products, services and processes, and seek to identify barriers to the creation of healthier indoor environments, gaps in present knowledge, and opportunities for voluntary initiatives. Through consultation with industry, government and other key stakeholders, the most instructive initiatives will be evaluated to identify key success factors and for their potential as voluntary initiatives which could compliment and/or supplement existing regulatory measures.

CMHC Project Officer : *Thomas Green*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN : 2106 0200001

STATUS : Ongoing Project

LIGHTING

TESTING THE ADEQUACY OF RESIDENTIAL LIGHTING IN A CARE CENTRE: NEW AGE-ADJUSTED NORTH AMERICAN ILLUMINATION STANDARDS

The objective of this CMHC External Research Program project is to undertake a field study on the effectiveness of lighting in two residential care centres with remarkably different lighting levels. Two residential care centres for seniors suffering from Alzheimers in western Canada, built similarly except for orientation of the buildings to the sun and levels of illumination, offer an opportunity to assess the impact of lighting levels on the residents and caregivers of the centres. Illumination levels were assessed by means of light measurements over a two-day period as well as the lighting specifications for the buildings. Usage patterns by the residents of the buildings and satisfaction of staff and visitors with the lighting levels were collected. The results of this study will be discussed in relation to current North American Illumination Standards and should be of value for designers of residential care buildings.

CMHC Project Officer : *Virginia Salares*

Division : External Research Program
Research Division

AVAILABILITY : Publication is not available

CIDN : 2020 0200001

STATUS : Ongoing Project

MANUFACTURED HOUSING

CONTRIBUTION TO DEVELOP A MULTILINGUAL DIRECTORY OF CANADIAN MANUFACTURED HOUSING COMPANIES

The objective of this project is to develop a multilingual directory of Canadian manufactured housing companies.

CMHC Project Officer : *Louis Musto*
Division : Canadian Housing Export Centre
AVAILABILITY : Publication is not available

CIDN : 2098 0900001
STATUS : Ongoing Project

LAND USE ISSUES IMPEDING THE PROVISION OF AFFORDABLE HOUSING WITH MOBILE HOMES

The study will summarize the manufactured (mobile) home legislative environment across the U.S. and Canada, identify legislative and land use impediments blocking improved market share on the part of the Canadian industry, analyse the relevance of the pro-active U.S legislative environment as a paradigm for Canadian legislative reform and develop suggestions for manufactured home land use and legislative development in Canada.

CMHC Project Officer : *Doug Pollard*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2154 0200001
STATUS : Ongoing Project

MANUFACTURED HOUSING CONSULTANTS' TRAINING PROGRAM

The objective of this partnership project with the Canadian Manufactured Housing Institute is to develop and pilot a training program for retailers in the manufactured housing industry. This training will provide retailers with the skills, tools and knowledge on the technical, financial, regulatory and other aspects of their industry to better serve their clients effectively and professionally. CMHI will be responsible for overseeing the development and translation of the training material and delivery of the two-day pilot workshop session.

CMHC Project Officer : *Darrel Smith*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2196 0200001
STATUS : Ongoing Project

REVITALIZATION OF THE MANUFACTURED HOUSING INDUSTRY IN CANADA TO PROVIDE AFFORDABLE HOUSING EFFECTIVELY

In Canada, mobile homes are usually built to the CAN/CSA-Z240 MH standard (Z240) rather than to the provincial code, although some provinces require mobile homes to be built to the provincial building code. The National Building Code (NBC) forms the basis for regulating all site-built housing.

In the United States, the mobile home industry operates under the federal Housing and Urban Development (HUD) Code--a performance-based code which appears to produce mobile homes with similar performance characteristics to Canadian manufactured mobile homes. MHI Canada suggested that there may be situations where the NBC and its provincial equivalents or the Z240 standard have more stringent requirements than are required for occupant health and safety. MHI Canada also believes that there may be other approaches to manufactured housing that will deliver equivalent housing performance, but at a reduced cost. MHI Canada suggested that an examination of the Canadian and U.S. manufactured home industries (with a focus on mobile homes) experience might identify instances where the standards/codes/ materials/procedures, etc. could be modified to improve housing affordability in Canada.

Because of the above scenario, Canada Mortgage and Housing Corporation (CMHC) designed and approved a project to investigate the situation. MHI Canada, the Canadian Manufactured Housing Institute (CMHI), the National Research Council (NRC), Industry Canada and building officials from Alberta, Ontario and Quebec were involved in the advisory committee for the project.

The project began in late 1997 with visits to 11 different Canadian plants (from British Columbia to the Maritime provinces) and one U.S. plant. People familiar with the U.S. market were interviewed. A number of appropriate reports were reviewed during the project. Two project preliminary reports (collections of working papers) were prepared and submitted to the advisory committee. In June 1998, the second preliminary report served as a basis for three round table sessions with the CSA, manufacturers and other parties with a specific interest in the subject matter.

This report is the official record of the project. The report analyzes relative market penetration of manufactured homes between the U.S and Canada and explores the issues which currently impede Canadian market success. Issues explored include construction cost details and general affordability, regulatory frameworks and barriers, distribution systems and regional differences. The report provides a two year plan of action to rebuild the Manufactured Housing Industry especially in relation to the revitalization of its construction standards.

Prepared by L. J. O'Riley & Associates Inc. Prepared for Canada Mortgage and Housing Corporation. CMHC Project Officer: Doug Pollard. Ottawa: CMHC, 1999. (Housing Affordability and Finance Series Research Report) 42 pages.

Order number: PE0338 ** Price: $12.95 + GST and handling charges.

MANUFACTURED HOUSING

STATUS : New Completed Report

AVAILABILITY : CMHC Information Products
P.O. Box 35005
Stn BRM B
Toronto, Ontario M7Y 6E5
1-800-668-2642
Fax orders from canada: 1-800-245-9274
International clients see page 9 for order instructions.

** SEE ALSO: Assessment of Prefabricated Buildings Systems Industry, p. 164

MOISTURE AND MOLD

EFFECTIVENESS OF VARIOUS BASEMENT TREATMENTS AND RENOVATIONS TO SOLVE IDENTIFIED BASEMENT MOISTURE PROBLEMS

This project deals with the effectiveness of various basement treatments and renovations to solve identified moisture problems. The houses have been selected and tested, and most of the renovation work has been undertaken. Testing in 2000 will evaluate how the remediated basements now deal with water and airborne humidity. The results will be presented in a series of case studies.

CMHC Project Officer : *Don Fugler*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2065 0200002
STATUS : Ongoing Project
**** NEW ****

FIELD TESTING OF MOISTURE IN STRAW BALE HOUSES

Straw bale construction is an innovative construction technique that is gaining popularity, particularly for rural houses. While these structures seem to be working well in the dry American southwest, the birthplace of the straw bale housing movement, it is unclear how well they will withstand extended periods of cold and damp conditions. The first set of tests looked at three small local investigations of straw bale house moisture content: one in several houses in Alberta/BC, one in older straw bale homes in the Gatineau area north of Hull, Québec and one in several houses in Nova Scotia. Reports are available from CMHC on the Gatineau and Nova Scotia sites, and from the CMHC project manager on the Alberta testing. Several of the houses showed high levels of straw moisture, particularly when probes were located near the exterior walls. Further monitoring and analysis is underway in both laboratory and test houses (listed as separate projects) to determine whether these occurrences will jeopardize the longevity of the straw.

CMHC Project Officer : *Don Fugler*
Division : Research Division

STATUS : Ongoing Project
AVAILABILITY : See Above

GUIDELINES FOR MOISTURE MANAGEMENT IN EXTERIOR WALL SYSTEMS

CMHC is providing financial and technical support to develop guidelines for moisture management strategies for exterior wall systems. The guidelines will address user requirements for long-term performance and durability of wall systems for the wide range of climate zones across North America.

CMHC Project Officer : *Silvio Plescia*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2199 0200001
STATUS : Ongoing Project

INVESTIGATION OF MOLD EXPOSURE LEVELS IN EXTERIOR REMEDIATION

CMHC is participating in research initiated by the Workers' Compensation Board of British Columbia, with the Carpenters Union of B.C. and the University of British Columbia to investigate workers' exposure to molds during remediation of moisture damaged buildings. The aim of this work is to assess the appropriateness of guidelines for external mold remediation. Guidelines currently exist for mold remediation inside buildings, but most condominium remediation is done from the outside. Many questions remain unanswered about the type and quantity of mold to be encountered, its transport mechanisms and cost effective means to reduce exposure to acceptable levels during exterior remediation. Exposure risk to mold products during external remediation has direct implications for worker health and safety, and for the affordability and quality of housing, and possibly occupant health. The work is expected to be complete by winter 2001.

CMHC Project Officer : *Ken Ruest, Mark Salerno*
Division : Research Division
AVAILABILITY : Publication is not available

STATUS : Planned
**** NEW PROJECT ****

MEASUREMENT OF THE HYGROTHERMAL PROPERTIES OF PLASTER AND STUCCO FOR STRAWBALE BUILDINGS

This project deals with lab testing to characterize the moisture performance of plaster and stucco over straw bales. Approximately 20 samples of interior or exterior wall coatings will undergo permeability testing. The information will be of use to straw bale builders, designers, and code officials.

CMHC Project Officer : *Don Fugler*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1867 0300007
STATUS : Ongoing Project

MOISTURE BEHAVIOUR OF WOOD FRAME WALL SYSTEMS WITH STUCCO CLADDING BY MODELING USING THE WALLDRY COMPUTER PROGRAM

The objective of this project is to undertake a parametric evaluation of the test parameters that are intended for study in the CMHC B.C. Coastal Wood Frame Envelope Design Test Program.

CMHC Project Officer : *Jacques Rousseau*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1816 0300004
STATUS : Ongoing Project
**** NEW ****

MONITORING OF MOISTURE CONTENT OF STRAW BALE HOUSE WALLS AT THE EXTERIOR STUCCO

Approximately twenty houses in Alberta and British Columbia have been instrumented with moisture sensors under the stucco of the exterior walls to examine the effect of rain penetration into straw bale walls. A related project is examining the use of straw bale as floor insulation in houses. The results of the floor project show that, without perfect drainage, the bales will get wet and rot will set in. A single copy of the straw bale floor report has been sent to the Canadian Housing Information Centre and should be on their shelves shortly. Results should be submitted by early 2000 and a summary of the straw bale monitoring produced by spring as a Research Highlight.

CMHC Project Officer : *Don Fugler*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1867 0300006
STATUS : Ongoing Project

PERFORMANCE EVALUATION OF WATER REPELLENTS FOR ABOVE GRADE MASONRY

The objective of this project is to evaluate the performance of various water repellents for above grade masonry on a comparative basis and develop practical methods to evaluate their effectiveness. This evaluation will be based on lab analysis and field testing as well as a literature review to find available information on water repellent performance. The initial part of this study, Phase I will be conducted under the CMHC External Research Program and will examine the issue of water infiltration while Phase II will examine exfiltration. Phase I is completed, a draft for Phase 2 has been received.

CMHC Project Officer : *Jacques Rousseau*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1696 0300002
STATUS : Ongoing Project

RAIN PENETRATION CONTROL SEMINAR

Water penetration is very a frequent, recurring problem for building owners, leading to damage of building components, interior finishes and building contents. It frequently leads to high repair costs and possible litigation. Over the past few years, research undertaken by CMHC, has contributed to the understanding and the prevention of rain penetration. In particular the pressure-equalized rainscreen has been applied and refined. In this seminar the causes of rain penetration will be examined. The results of CMHC research will be presented, along with design features and practical details, which will help prevent rain penetration in a variety of wall types. This full day seminar is targeted to architects, engineers, specifiers, builders, developers and building owners concerned about rain penetration and how to prevent it. The seminar has been presented in Toronto, Winnipeg, Edmonton, Vancouver. It will be presented in Montreal and Quebec City in early spring. This seminar was developed in cooperation with the Canadian Masonry Association, the Canadian Precast Concrete Institute and the Exterior Insulated Finish Systems (EIFS), curtain wall and steel manufacturers.

CMHC Project Officer : *Jacques Rousseau*
CIDN : 0838 0303005
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication will not be published

RE-INSULATION OF EXISTING FLAT-ROOF MULTI-FAMILY BUILDINGS IN QUÉBEC

A joint project with Hydro Québec to examine ways of re-insulating low-rise multi-family buildings for energy efficiency, without causing moisture problems in the attic. Field testing was complete in early summer 1997. A final report was prepared. Hydro Quebec has not yet released it to the public.

CMHC Project Officer : *Don Fugler*
CIDN : 1377 0801001
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

RESIDENTIAL DEHUMIDIFICATION STATE-OF-THE-ART

By means of an e-mail working group of experts, the current knowledge of state-of-the-art of residential dehumidification will be assembled. Included will be technologies, costs and benefits, and recommendations for best practices in housing. Dehumidifiers can consume high amounts of energy during their use and will create significant heat as well, a drawback during the cooling season. By winter 2000, CMHC will prepare an About Your House publication as a result of this project, to offer good advice to consumers on mechanical dehumidification.

CMHC Project Officer : *Don Fugler*

Division : Research Division

AVAILABILITY :
Publication is not available

STATUS : Planned

**** NEW PROJECT ****

STUDY OF RECURRING MOLD PROBLEMS ON THE ROSEAU RESERVE IN MANITOBA: PHASE TWO

The first phase of the project dealt with an investigation of eight houses on the Roseau River Reserve. Some of these houses had been remediated following the flood in 1997. Moisture problems were of a chronic nature, not directly related to flooding. Remediation and clean-up was found to be ineffective. This report is available.

The second phase of the project consists of developing an information kit for First Nations. The kit will assist First Nations to recognize when there is a mold problem and to take the necessary steps to deal with the problem. The report will be available in winter, 2000.

CMHC Project Officer : *Virginia Salares*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN : 2036 0200001

STATUS : Ongoing Project

MOISTURE AND MOLD

WALL MOISTURE PROBLEMS IN ALBERTA DWELLINGS

In partnership with the Alberta Housing Industry Technical Committee, this project investigated the problem of moisture ingress into low-rise wood frame housing in Alberta. A total of 50 buildings were evaluated for potential causes of moisture leakage problems. Some of the buildings in the study were under construction at the time of the investigation. This provided some insight into current building practices without having to open existing building walls. Few of the reported water leakage problems could be attributed to interstitial condensation, but the majority of cases were due to water infiltration from the exterior during wet weather conditions. The report from this project proposes various changes to current building practices to resolve these problems.

Prepared by Building Envelope Engineering Inc., Anton J. Vlooswyk, John A. Vlooswyk, James B. Posey. Prepared by Canada Mortgage and Housing Corporation and Alberta Housing Industry Technical Committee. CMHC Project Officer: Ken Ruest. Ottawa: CMHC, 1999.

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

NORTHERN HOUSING

FOUNDATION SYSTEMS FOR USE IN PERMAFROST AREAS

The purpose of this project is to conduct a study on foundation systems for use in Northern permafrost and intermittent permafrost areas. The study will assemble, document and analyse all data possible from literature searches and from the field on all known foundation systems used in the north. The final report will include a decision making tree to enable communities, homeowners, builders and renovators to make informed and appropriate choices in foundation systems.

CMHC Project Officer : *Darrel Smith*

Division : Research Division

CIDN :

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

INNOVATIVE FOUNDATIONS, HEATING AND VENTILATION

This R&D&C (research, development, commercialization) project and first stage monitoring is complete and a report due before the end of 1998. CMHC, Yukon Housing Corporation (YHC) and Yukon Energy partnered in building two research/demonstration houses in Dawson City, Yukon. This work is a continuation of previous successes in R&D&C of the space frame foundation technology now being exported to Alaska. The thrust of the current foundation work is to reduce cost, develop a technology that can be locally manufactured and reduce the height of the crawl space. A torque tube HSS steel section is under one house. The other house will be an extension of the sheet metal reinforced plywood monocoque technology resting on three bearing points. Lots of ground movement has been reported so the test site is proving to be a good demonstration. After a review of northern and remote technology, the heating and ventilation systems incorporate and optimize energy efficiency, minimal equipment and sustainable ventilation operation. Construction is complete and the houses are occupied. Commissioning of the project was a large task and the systems appear to be running efficiently at about half the energy consumption of a typical northern house. The mechanical technology was used on another YHC project at substantial capital savings and with some modifications appears to be the technology of choice. Work is underway to develop a more cost effective and simple foundation system.

CMHC Project Officer : *Rob Duncan*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1676 0300001
STATUS : Ongoing Project
**** NEW PROJECT ****

NORTH WEB-SITE

The purpose of this partnership project was to design, establish and maintain a dedicated NoRTH Web-Site for a two year period. The project partners are CMHC, Alaska Housing and Finance Corporation, and Yukon College. The web-site includes relevant technical information such as factsheets of research reports and the Frostline newsletter. It also includes discussion groups to provide a means of ongoing and current communication. The web-site has links to other relevant web-sites and can be visited at www.NoRTH-RTHN.org. The web site is updated with new articles and factsheets from time to time.

CMHC Project Officer : *Darrel Smith*
Division : Research Division
AVAILABILITY : Publication will not be published

CIDN : 1886 0200001
STATUS : Ongoing Project

SEE ALSO:

- Soil and Flora Restoration After Ground Disturbance, p. 117
- Alternative Home Energy Sources for the North, p. 29

CONTRACT MANAGEMENT COURSE FOR RESIDENTIAL PROPERTY MANAGERS AND BUILDING OWNERS

This project will develop course content to provide an introduction to construction/contract management processes for residential property managers, building owners and anyone involved in the administration of multi-unit residential buildings. The course material will be as applicable to the management of major service contracts as it is to major construction works including repair, replacement and/or rehabilitation projects. Topics covered in this course include the different types of construction or service contracts, a discussion of the construction process, administering the tendering process, evaluating the tendered bids, contractor /consultant selection, bonding and insurance requirements, the building owners responsibilities and those of the contractor/consultant. This project should be completed by summer, 2000.

CMHC Project Officer : *Silvio Plescia*

Division : Research Division

AVAILABILITY : Publication is not available

STATUS : Planned

**** NEW PROJECT ****

MULTI-UNIT RESIDENTIAL BUILDING MANAGEMENT AND THE ISO 14001 STANDARD FOR ENVIRONMENTAL MANAGEMENT SYSTEMS

The report highlights how the international standard for environmental management systems may be applied to the residential property management industry. The report examines both current residential building management practices and the ISO 14001 standard, in effort to find out whether the standard is of value to the industry and presents a preliminary investigation of how it could be implemented.

The report provides background information on various building management scenarios, and key players in the industry. It includes both non-profit and for-profit multi-unit residential buildings, including housing co-operatives and condominiums. Currently available building management resources, including books and computer software, are listed in the report, along with related associations. The report also provides a brief examination of legislation and regulations related to residential property management and the environment.

In order to acquaint the reader with ISO 14001, the report briefly documents the history of the standard, along with a brief description of its major principles and elements. The benefits of the standard are presented, along with a look at its overall level of acceptance, in both Canada and on the international scene.

The main research method for the CMHC report included a survey conducted through a series of interviews with people directly involved in managing residential apartment buildings, condominium complexes, offices and commercial properties. Other people interviewed include government employees, ISO 14000 experts, product and services suppliers, health and environment experts, and property management association members. The report includes a discussion of the survey results, which also appear in the appendices in tabular form. Additional information in the report was gathered from a variety of printed and electronic sources, and from members of an advisory board made up from industry representatives.

Recommendations made by the report include the education of the industry through conferences, workshops and association newsletters and government incentives to encourage participation. The report also makes various recommendations for implementation of the standard, and proposes the use of focus groups and pilot projects for further study. A final recommendation is the development of a set of specific guidelines for implementing the standard in residential building management.

This report will be of interest to anyone interested in property management and sustainability. The report provides valuable information for anyone interested in setting up an environmental management system for a multi-unit residential building based on the requirements of the ISO 14001 standard.

Prepared by Vince Catalli, Kathleen Dorner, Environmental Management Institute. CMHC Project Officer: Silvio Plescia. Ottawa: Canada Mortgage and Housing Corporation, 2000. (External Research Program)

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

TECHNICAL AUDIT COURSE FOR PROPERTY MANAGERS

This project aims to develop a course for property managers on the technical audit of high-rise residential buildings. Using a building as a system approach, this course will provide property managers and building owners with a perspective of the interaction of all building systems and components. Such training is not available to residential property managers in Canada. Technical audits, an organized review of building systems, are an effective way to assess the condition of a building, to understand how the building is performing and to provide a sound basis for making maintenance, repair and upgrade decisions. The course provides the property manager with insights into the technical audit process and highlights the requirements for undertaking technical audits of residential buildings including the scope of the work and consultant qualifications. The course also introduces the fundamental principles of building science to encourage holistic solutions to building problems. This work will be completed by summer, 2000.

CMHC Project Officer : *Silvio Plescia*

Division : Research Division

AVAILABILITY : Publication is not available

STATUS : Planned

**** NEW PROJECT ****

RENOVATION AND INSPECTION

CANADIAN ASSOCIATION OF HOME AND PROPERTY INSPECTORS INITIATIVE

The purpose of this multiphase project is to develop national occupational standards for the private home inspection and municipal building code inspection sectors. The project is supported by the industries, Human Resources Development Canada and CMHC. These standards will be used separately by the private inspectors and the building officials to develop nationally recognized certification programs for accreditation of training programs, prior learning assessment and recognition tools, and provide information on the occupations within their industries. The national occupational standards will focus on common competencies between both groups as well as recognizing the uniqueness of each sector.

CMHC Project Officer : *Darrel Smith*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1962 0200002
STATUS : Ongoing Project

CANADIAN RENOVATION INDUSTRY AND THE INTERNET: USAGE PATTERNS, 1998-2001

The objective of this project is to survey renovators about their use of e-mail, web-sites, and interactive online communications.

CMHC Project Officer : *Darrel Smith*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 2015 0200001
STATUS : Ongoing Project

GUIDE FOR THE HEALTHY RENOVATION OF A ONE STOREY HOUSE CIRCA. 1960-1979

The objective of this project is to provide consumer information on typical approaches to the repair and renovation of bungalow-style houses built between 1960-1979. The advice considers occupant lifestyle and needs, structural and maintenance requirements, "Healthy Housing" improvements (including environmental and energy-efficiency), and the impact on home equity and resale value. The publication will include case studies of common renovations to this style of house. The guide will resemble the initial publication in this series which describes appropriate renovations to 1½ storey houses.

CMHC Project Officer : *Don Fugler*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2202 0200001
STATUS : Ongoing Project
**** NEW ****

HEALTHY HOUSING INSPECTION CHECKLIST: CMHC HOMEOWNER'S AND HOMEBUYER'S CHECKLIST FOR MAINTENANCE AND REPAIR

The current CMHC's Homeowner's and Homebuyer's: Inspection Checklist for Maintenance and Repair is being revised to both update and include a Healthy Housing evaluation "tool". It will provide homeowners and homebuyers with a pre-purchase or pre-renovation guide for performing an inspection on their house. Physical condition, IAQ, energy and environmental and maintenance and repair information will be included in the document. It will be beneficial in enabling consumers to make more informed decisions prior to hiring the assistance of a private home inspector should the need arise. This advisory document will be available early in 2000.

CMHC Project Officer : *Darrel Smith*

CIDN : 1901 0200001

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

HEALTHY HOUSING RENOVATION PLANNER: RENOVATE THE HEALTHY WAY

The "Healthy Housing Renovation Planner" is a step-by-step workbook to planning a healthy renovation.

Chapter One explains the links between your home, your health and the environment. It presents the key principles of Healthy Housing - contributing to occupant health, reducing energy consumption, conserving natural resources, minimizing environmental effects and balancing cost and practicality.

Chapter Two discusses the health effects of indoor air quality, with special attention to environmental hypersensitivities. A Home Health Checklist guides you through your home to help you identify sources of air quality problems - and solutions to them.

Chapter Three discusses the importance of up-front planning, walking you through the things you should think about before you begin your project. It describes the "house as a system", how you can renovate according to Healthy Housing principles and how you can get the most for your renovation dollar. Chapter Three will help you determine whether you have the skills and the time to do the job yourself. If you decide to hire a professional, Chapter Three gives you the information you need to choose the renovator who is best for you. The Chapter also discusses the critical importance of a written contract, insurance, building codes and by-laws and ways to minimize inconvenience while a project is under way.

The rest of the Renovation Planner deals with typical renovations, both large and small. In each chapter, you'll find several steps to help you plan a healthy and affordable project. Each chapter focuses on key issues involved in the renovation project: taking stock of the part of the house to renovate, evaluating options and strategies for making changes, and making a plan.

RENOVATION AND INSPECTION

There are charts and checklists throughout the Renovation Planner so you can record your observations and your choices . Project planning worksheets help you assemble all the parts of the puzzle in one place. Lists of publications provide you with additional information on the subjects discussed.

Ottawa: Canada Mortgage and Housing Corporation, 1999. 320 pages.

Order number: NE2172 **Price: $34.95 + GST and handling charges.

STATUS : Completed Report

AVAILABILITY : CMHC Information Products
P.O. Box 35005
Stn BRM B
Toronto, Ontario M7Y 6E5
1-800-668-2642
Fax orders from Canada: 1-800-245-9274
International clients see page 9 for order instructions.

PRIORITIZED PRACTICAL APPROACHES FOR ESSENTIAL REMEDIATION, REPAIR AND MAINTENANCE PROJECTS

The purpose of this project will be to identify and prioritize remediation work which must be corrected before undertaking common renovation projects to ensure the proper preservation and state of healthiness of the house. Information will be provided on how to identify the prioritized work, consequences of not doing the work, practical solutions, and benefits. The resulting information will be presented in twelve independent factsheets which will be useful to homeowners to help them prioritize essential repair work either in isolation or as part of a renovation project. The information could also be used by renovators as a tool to help convince homeowners of other essential repairs which need to be corrected as part of a renovation project when applicable.

CMHC Project Officer : *Darrel Smith*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2227 0200002
STATUS : Ongoing Project
*** NEW ***

RENOVATION OF GENERIC HOUSING STYLES - POST-WAR ONE-AND-A-HALF STOREY

The objective of this project is to provide consumer information on typical approaches to the repair and renovation of post-war one-and-a-half storey houses. Criteria for these approaches will include occupant lifestyle and needs, structural and maintenance requirements, "Healthy Housing" improvements (including environmental and energy-efficiency), and the impact on home equity and resale value. CMHC is preparing the document for publication in late 1999.

CMHC Project Officer : *Don Fugler*

CIDN : 1430 0200001

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

RENOVATOR TRAINING IN CANADA: AN EVALUATION AND SITUATION REPORT

The purpose of this project was to investigate the current situation with respect to renovation contractor training in Canada. A situation report was produced to determine who else is providing training for the residential construction industry with a focus on the renovator. Other issues related to this include marketing, financing, existing materials, relationship to certification, native initiatives, and options for delivery that reach beyond current CHBA membership, (i.e.: community colleges, private firms, etc.). The format and method of delivery was also researched (i.e.. five day, correspondence, computer-based, etc.). Recommendations presented in the study have been reviewed with industry and options for their implementation are being considered.

STATUS : Completed Report

AVAILABILITY : Publication will not be published

ACTION PLAN FOR REDUCING GREENHOUSE GASES IN RURAL COMMUNITIES

The purpose of this project is to prepare an integrated planning strategy that would provide guidance for rural municipalities across Canada facing the challenges of developing action plans for achieving Kyoto targets for reducing greenhouse gas (GHG) emissions. A rural Canadian community that will be developing an action plan for reducing GHGs will be selected for study. Funding will be directed to documenting the development of the action plan to ensure that the appropriate actions are considered, implemented, monitored and the results disseminated. The objective is to provide an innovative, comprehensive planning approach for rural communities that integrates transportation planning, land use planning, new housing and retrofits, waste management, economic development and the regulatory environment.

CMHC Project Officer : *Susan Fisher*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2105 0200001
STATUS : Ongoing Project

CANADIAN HOMES AND CLIMATE CHANGE

The object of this research is to create a guide for consumers on Canadian homes and climate change. The guide, in the form of a questionnaire, will help consumers identify where they can make changes in their activities and households to minimize their greenhouse gas creation. The guide should be short and easy to complete. The CMHC will contribute the Guide as part of the broadly based, national social marketing initiative to reduce climate change.

CMHC Project Officer : *Don Fugler*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2120 0200001
STATUS : Ongoing Project
**** NEW ****

CENTRE ISci: PARTICIPATION AND HOUSING EXHIBIT IN THE MONTREAL INTERACTIVE SCIENCE CENTRE AT THE VIEUX PORT

CMHC is participating in an Interactive Science Centre (Centre iSci) which will be created as part of the restoration of the Old Port of Montreal and will open in May 2000. The Centre's exposition of the science and technology of twelve industrial sectors will expose the visitor to the concepts, potential and challenges of each sector through highly interactive exhibits, multimedia displays and electronic connections to other national and international resources. Its goal is to foster creative and curious attitudes in the visitors, provide knowledge of natural processes and principles underlying each sector and present issues of importance to the next generation to improve their ability to seize the opportunities of the future. The theme of CMHC's participation and exhibition in the Habitat sector will be Healthy Housing and sustainable design. Links will also be made to other represented sectors which have implications for housing such as transportation, communication and medicine.

CMHC Project Officer : *Thomas Green* ***CIDN*** : 2148 0200001

Division : Research Division ***STATUS*** : Ongoing Project

AVAILABILITY : Publication will not be published

COMPARISON OF COSTS AND RESOURCE-EFFICIENCY OF SEVEN RESIDENTIAL LANDSCAPE OPTIONS

This research study is to quantify and compare the annual horticultural inputs (i.e. materials), time, costs and environmental impacts associated with maintaining seven different landscape types. After annual inputs are determined, the capital and life-cycle costs for a typical residential lot will also be calculated. The seven landscape types will include (in post-establishment growth states): wildflower meadow/prairie; naturalized woodland/shade garden; xeriscape; lawn area with hardy, low maintenance species; manicured lawn with conventional species; ornamental shrubs and trees; and annuals and perennial borders. The study will assess the potential environmental impacts of each option as well as their aesthetic and functional implications. In addition, potential benefits, such as wildlife habitat, bio-diversity and reduced storm water run-off will be identified and quantified. The final product will be a publication intended for municipal decision makers, advisors in planning and environmental management departments, homeowners and property managers. It will show how they can save resources, reduce environmental impacts, as well as save money and time through reductions in horticultural inputs.

CMHC Project Officer : *Susan Fisher* ***CIDN*** : 1976 0200001

Division : Research Division ***STATUS*** : Ongoing Project

AVAILABILITY : Publication is not available

CONSERVATION CO-OPERATIVE CASE STUDIES DOCUMENTATION

The objective of this project is to develop the Conservation Co-operative case study documentation, presentation materials and report using the Green Building computer program.

CMHC Project Officer : *Sandra Marshall*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1817 0300003
STATUS : Ongoing Project
**** NEW ****

CONSTRUCTION RESOURCE MANAGEMENT COURSE - PHASE II

A private and public sector consortium has been established to develop a methodology for assisting industry to better understand, control and reduce the levels of construction, renovation and demolition (CRD) waste. To date, the partners include Industry Canada, Canada Mortgage and Housing Corporation, Alberta Environmental Protection, NWT Department of Resources, and PCL Constructors Canada Inc. Phase I was the development of a CRD training course in hard copy. The course provides practical and comprehensive information on resource management issues in the Canadian CRD industry. It is intended for project managers which include, but are not limited to: engineers, architects and CRD contractors. Phase II will consist of an Internet based CRD project management course that will: provide current resource management information and case-specific solutions; contribute to the development of standard managerial practice; promote widespread communication of the best resource recovery techniques, contribute to economic growth and job creation; promote long-term behavioural change; and help industry associations and government departments meet mandated environmental targets. The project is planned for completion in 2000.

CMHC Project Officer : *Darrel Smith*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2032 0200001
STATUS : Ongoing Project

DEMONSTRATION OF HEALTHY HOUSING ON RESERVE

This project is being undertaken in partnership with First Nations communities. The objectives are to support the design, construction and demonstration of five on-reserve Healthy Houses near Montreal, Belleville, Thunder Bay, Winnipeg and on band land in N'Dilo and Dettah near Yellowknife. To date, one house has been built and demonstrated at Roseau River, Manitoba. A second is under construction at Eagle Lake, Ontario. Progress is being made with the design work, community consultations, site selection, and the sourcing of funding partners and donor suppliers. Native communities will own and occupy the demonstration houses which will be constructed by locally trained trades and specialists. A goal of the project is to better equip First Nations community and other decision makers, and the public to understand the importance of constructing more affordable, appropriate and environmentally sustainable housing. A CMHC report will be produced detailing house costs and benefits, designs and systems at the completion of the project.

CMHC Project Officer : *Chris Ives*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1969 0200001-2
STATUS : Ongoing Project

DESIGN AND TEST A PROTOTYPE UTILITIES MODULE - CHUM

To design, build and test a Prototype Utilities Module (suitable for hookup to the demonstration Healthy House in the First Nation community of Eagle Lake, Ontario). The goal is to demonstrate the technology which can provide individual houses or clusters of houses with an autonomous or removable/portable water, sewer, heating and electrical infrastructure. The first module, for a single house, is being constructed in Kenora, and will eventually be installed at the First Nations Healthy Housing demonstration at Eagle Lake, Ontario, early in 2000. Initial hookup will be to a mobile home, for test purposes, until completion of the actual demonstration house in Spring 2000 This approach will decrease the up-front capital investment cost for housing on-reserve and allow for more dwelling units to be serviced within a limited capital budget.

CMHC Project Officer : *Chris Ives*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2156 0200001
STATUS : Ongoing Project

SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

HEALTHY HOUSING SEMINAR

A two and a half hour consumer Healthy Housing seminar, with a renovation focus, has been developed and packaged for delivery. The material was based on existing material produced by the CMHC Ontario and British Columbia Regional offices. It was also updated to include recent research and to give it a national scope. Examples of case studies were included by incorporating material from the 1994 and 1996 Renovation Demonstration projects. CMHC is currently negotiating a partnership with the building supply industry for delivery of these seminars. A partnership has now been established for Quebec, British Columbia, New Brunswick, Nova Scotia, and Newfoundland. RenoDepot is delivering the seminar in Quebec, Home Depot in B.C., and Kent Building Supplies in the Atlantic. Negotiations with other partners are still underway. A condensed 30-minute presentation of the Healthy Housing Seminar was also produced. This material can be used at home builder association meetings, various industry shows and conferences and also in the preparation of background documents.

CMHC Project Officer : *Darrel Smith* — ***CIDN*** : 1906 0200001

Division : Research Division — ***STATUS*** : Ongoing Project

AVAILABILITY : Publication will not be published

JOINT RESEARCH BETWEEN CMHC AND KHI TO DEVELOP SUSTAINABLE PLANNING AND CONSTRUCTION GUIDELINES FOR KOREAN COUNTRY STYLE HOUSING DEVELOPMENT

The purpose of this project is to develop sustainable site planning and construction guidelines through a specific site near Seoul, Korea.

CMHC Project Officer : *Jay Thakar* — ***STATUS*** : Ongoing Project

Division : Canadian Housing Export Centre

AVAILABILITY : Publication is not available

LANDSCAPE CASE STUDY ARTICLES: DEVELOPMENT OF CONSUMER INFORMATION MATERIALS ON SUSTAINABLE COMMUNITY PLANNING

The purpose of this project is to develop a series of articles highlighting homeowners with resource-efficient, low-maintenance landscapes to encourage readers to consider adopting sustainable and time saving alternatives. Three articles will be published in community newspapers in each of Canada's five regions.

CMHC Project Officer : *Susan Fisher* — ***CIDN*** : 2158 0200001

Division : Research Division — ***STATUS*** : Ongoing Project

AVAILABILITY : Publication is not available

OVERCOMING THE BARRIERS TO SUSTAINABLE REAL ESTATE DEVELOPMENT IN CANADA

The research will establish the features or framework by which a community might be deemed to be considered sustainable. Using this analytical framework it will develop a clear picture of the status of sustainable development in Canada and the barriers being faced in the implementation of sustainable communities. It will develop a parallel analysis of successful international projects focusing on those which successfully address problems encountered in Canada and from this comparison generate potential directions which might assist Canadians in overcoming barriers to sustainable real estate development.

CMHC Project Officer : *Doug Pollard*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2051 0200002
STATUS : Ongoing Project

PLANNING SUSTAINABLE COMMUNITIES

The purpose of this project is to develop an updated advisory document on community planning and design. The updated document is intended to be a state-of-the-art report, reflecting the latest thinking in the field. The emphasis of the document will be on presenting practical examples (best practices and case studies) of innovative, sustainable and cost-effective approaches to community planning and design. Final report is in production.

CMHC Project Officer : *Brian Eames*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1553 0200001
STATUS : Ongoing Project

PROTOTYPE HEALTHY HOUSE AT ROSEAU RIVER RESERVE IN MANITOBA

The objective of this study is to undertake and complete the conceptual design, construction drawings and inspections for a Prototype Healthy House at Roseau River Reserve in Manitoba.

CMHC Project Officer : *Chris Ives*
Division : Prairie Region Business Centre
AVAILABILITY : Publication is not available

CIDN : 2036 0200002
STATUS : Ongoing Project

RESIDENTIAL GREENWAYS IN TRANSITION: FOUR DECADES OF PRACTICE IN WATERLOO

This research examines the evolution and assesses the merits of residential greenways employed in the City of Waterloo over the past four decades.

CMHC Project Officer : *Susan Fisher*

CIDN : 2144 0200015

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

RYDER LAKE "URBAN VILLAGE": DEVELOPMENT PLAN FOR A SUSTAINABLE COMMUNITY = LE VILLAGE URBAIN DE RYDER LAKE : PLAN D'AMÉNAGEMENT POUR UNE COLLECTIVITÉ DURABLE

Chilliwack, a community of sixty-five thousand located in British Columbia's Lower Mainland region, has responded to the challenge of accommodating a fast-growing population in an environmentally responsible manner by launching a project to build a sustainable community or "urban village" on 2,500 hectares in the adjacent hillside area of Ryder Lake. Recognizing the groundbreaking nature of such an initiative, in fall 1994, the AsCsT Program awarded the District of Chilliwack's Municipal Development Department a grant to be used towards the preparation of a plan, including development policies, standards and guidelines, for a high-density, compact community of approximately 40,000 people. A related goal of this project was to create an efficient approvals process for permit applications for development in Ryder Lake.

This AsCsT project resulted in the preparation of the Ryder Lake Area Plan ("The Plan"). The Plan proposes the use of a combination of flexible regulatory tools to guide the development of the Ryder Lake sustainable community. As a starting point, the District designated the entire Ryder Lake area as a "Development Permit Area" under the Municipal Act. This approach allows the District to protect the natural environment and to establish guidelines regarding the form and character of commercial and multi-family development. Furthermore, construction in Ryder Lake will be regulated by the application of performance standards rather than conventional prescriptive standards which are typically used to control suburban development. By focusing on the objectives and intent of the design, performance standards provide municipal authorities with an acceptable amount of control over the development process while, at the same time, enabling developers to build in a more creative manner.

The goals of the AsCsT Program - improving housing affordability, choice and quality through regulatory change - are clearly reflected in the development of sustainable communities such as Ryder Lake. The results of this project are very much applicable to other communities wishing to plan growth and development in a way that enriches the lives of its citizens while respecting the environment.

Affordability and Choice Today (A.C.T.) Demonstration Project / District of Chilliwack, British Columbia. Prepared by Julie Tasker-Brown. Prepared for: Federation of Canadian Municipalities, Canadian Home Builders' Association, Canadian Housing and Renewal Association, Canada Mortgage and Housing Corporation. Ottawa: The Federation; The Associations; CMHC, 1998.

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

SOIL AND FLORA RESTORATION AFTER GROUND DISTURBANCE

This research will examine local soils and indigenous plants in the North to arrive at a Best Practices Guide for means of restoring healthy ground cover after disturbance, at the least cost. In the North especially, ground cover loss exacerbates erosion of buildings, roadways and community infrastructure. Soil damage due to exposure leads to summer dust which deteriorates building exteriors and heating systems; impedes the operation of windows and doors; and affects the health of both the occupants and the community at large. Ground cover damage is also one of the leading factors for the break-down of permafrost. The Guide will be of interest to communities, health care providers, northern government housing agencies as well as to other northern countries. The work will be complete by the end of 2000.

CMHC Project Officer : *Aleta Fowler*

Division : Research Division

AVAILABILITY : Publication is not available

STATUS : Planned

**** NEW PROJECT ****

SUSTAINABLE COMMUNITY DESIGN

This project sought to identify the features of a sustainable community and how they can be applied to the design of a new community. Several Canadian and international examples of built or proposed communities were used to seek out theses features. It also tried to test consumer response to these design features by using images and facts from these example case studies and from a proposed design for a Canadian subdivision.

The study results are incorporated in a CD-ROM. It presents 150 sustainability features organized in distinct categories ranging from the house scale to the large community level. Text and images describe each feature and its effect on sustainability. All features are linked to a set of case studies where they are shown with pictures, drawings or diagrams. A list of references supports each aspect of community design along with Internet connections to many original sources. This component of the disc provides an extensive and comprehensive check list of all the elements that need to be considered in the design of a sustainable community. The visual descriptions of these elements would assist a designer in setting a starting point for a planned new community.

Visualizing the attributes of a sustainable community can also help gauge consumer reaction. The disc includes a complete questionnaire, in a sequence of electronic images, that can be used as a means of exploring the market for innovative features which cannot be found and experienced in real life settings.

Prepared by Eduard Epp, Richard Perron, William T. Perks, Chris Sale, David van Vliet.

Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

NOTE: CD-ROM available by interlibrary loan only.

STATUS : Completed Report

AVAILABILITY : Interlibrary Loans

Canadian Housing Information Centre

Canada Mortgage and Housing Corporation

700 Montreal Road

Ottawa, Ontario

K1A 0P7

Tel.: 613-748-2365 or 1-800-668-2642

Fax.: 613-748-4069

Email: chic@cmhc-schl.gc.ca

International clients see page 9 for order instructions.

SUSTAINABLE DESIGN CHARRETTE FOR THE SOUTH EAST FALSE CREEK NEIGHBOURHOOD OF VANCOUVER

This project will report on the rationale and results of a design charrette structured to test the viability of sustainable community development guidelines. The report will include a brief history of the guideline development, the reasons for holding a charrette, a synopsis of CMHC research that was used, a critique of the effectiveness and value of the charrette. The report will also include drawings done at the charrette itself.

CMHC Project Officer : *Doug Pollard*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2076 0200001
STATUS : Ongoing Project

SUSTAINABLE LANDSCAPE DESIGN FOR RESIDENTIAL DEVELOPMENTS

The objective of this project is to highlight the link between sustainable development for housing with the condition, composition and use of native vegetation.

CMHC Project Officer : *Susan Fisher*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 1466 0200001
STATUS : Ongoing Project

SUSTAINABLE MUNICIPAL INFRASTRUCTURE DESIGN FOR A RESIDENTIAL DEVELOPMENT

This project's objective is to review current practices pertaining to suburban communities in Southern Ontario, Canada and in other parts of the world; consider alternative design options for subdivisions and provide practical and up-to-date recommendations for the incorporation of sustainable community features.

CMHC Project Officer : *Susan Fisher*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2144 0200021
STATUS : Ongoing Project

SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

VIRTUAL REALITIES AS EVALUATIVE SUSTAINABLE COMMUNITY DESIGN CRITERIA

The objective of this project is to identify appropriate design criteria and develop, test and evaluate a method for determining consumer receptivity to sustainable community design using a series of virtual reality simulations. The criteria and simulations will be recorded on a CD-ROM to assist designers and developers in finalizing community designs and in convincing officials and public about the merits of such designs. Publication is expected in the spring of 2000.

CMHC Project Officer : *Fanis Grammenos*

Division : External Research Program
Research Division

AVAILABILITY : Publication is not available

CIDN : 2013 0200001

STATUS : Ongoing Project

** **SEE ALSO:** Sustainable Development in Canada, p. 176

WATER CONSERVATION, REUSE & MANAGEMENT

CASE STUDIES OF POTENTIAL APPLICATIONS OF INNOVATIVE RESIDENTIAL WATER AND WASTEWATER TECHNOLOGIES

Objectives of this project were to identify and describe opportunities for use of innovative water supply and wastewater systems for residential buildings, to compare costs and benefits of traditional and innovative systems, and to propose solutions that could lead to more cost-effective and environmentally friendly housing. The innovative technologies considered are those used in the Toronto Healthy House: a rainwater cistern system, and recycling of all household wastewater, for non-potable uses. In five case study sites in Nova Scotia, life cycle costs of these technologies were compared with costs of traditional infrastructure alternatives -- municipal water and wastewater, or wells and on-site sewage disposal systems. These comparisons indicate that the Healthy House technologies could be cost-competitive in an urban or suburban subdivision if fire protection is not required; a non-urban area as an alternative to a cluster system, or in a non-urban area as an alternative to a remedial central system. Other situations where they might be appropriate are also discussed. Other non-cost issues -- technological, management, regulatory, and public and political -- that must be considered if these technologies are to be adopted are identified and discussed. Recommendations are offered about strategies and actions that can take advantage of opportunities and address problems and issues related to adoption of innovative technologies for residential water supply and wastewater management.

Prepared by D.H. Waller, M.A. Salah, Centre for Water Resources Studies, DalTech. CMHC Project Officers: Peter Russell, Stéphanie McFadyen. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

CASE STUDIES OF WATER CONSERVATION INITIATIVES IN MULTIS

CMHC, in partnership with City of Toronto Better Buildings Partnership, will document case studies of water conservation retrofits for multi unit residential buildings. The building profile, water conservation measures, costs and resulting water and energy savings will be described. The studies will serve as examples to encourage water use efficiency in other building and will eventually appear on CMHC's website. A research report is expected early in 2000.

CMHC Project Officer : *Cate Soroczan*
Division : Research Division
AVAILABILITY : Publication is not available

STATUS : Planned
**** NEW ****

DEVELOPMENT OF A RESIDENTIAL WATER USE MODEL

The first phase of this project developed a user-friendly computer model that determines daily water consumption for a prescribed pattern of water use in a house that incorporates facilities to treat and reuse grey water. The program will be of value to designers of innovative residential plumbing systems. Its first application was in the design of the water system for the Toronto Healthy House and the Conservation Co-op apartment building in Ottawa. This second phase of the project saw the revision of the WaterSave program to more realistically represent water quality and account for contamination concentration build-up in the recycled water. Sample reuse situations were also accounted for in the revised model and the user's manual was updated. The Software and manual are currently being translated into French.

CMHC Project Officer : *Cate Soroczan*
Division : Research Division
AVAILABILITY : Publication will not be published

CIDN : 1422 0200002
STATUS : Ongoing Project

ECONOMIC FEASIBILITY STUDY OF WATER REUSE AND TREATMENT TECHNOLOGIES

To undertake and complete an economic feasibility study of water reuse and treatment technologies. The contractor will assess ten case studies of on-site water reuse applications. Final draft has been received and further attention is being paid to the financial aspects of water reuse and full costing.

CMHC Project Officer : *Cate Soroczan*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2089 0200002
STATUS : Ongoing Project

GREYWATER TECHNOLOGY SOFTWARE DEVELOPMENT

CMHC is participating with Water Technology International in this research project to further develop the TECHSPEX software package to address water use, reuse and treatment. This product will provide a number of technical solutions to onsite or small community water treatment requirements based on user needs. Costs for the items specified and product availability are also included in the software development.

CMHC Project Officer : *Cate Soroczan*
Division : Research Division
AVAILABILITY : Publication will not be published

CIDN : 1927 0200005
STATUS : Completed Report

HOUSEHOLD GUIDE TO WATER EFFICIENCY

Based on a highly successful document by the Region of Durham, this project will create a Canadian Water Efficiency Guide for homeowners. The document requires further research of national water use and pricing statistics, regional water needs, and regionally appropriate information on xeriscaping. The completed version will be available in hard copy and a CD version for individual municipalities to produce and disseminate it.

CMHC Project Officer : *Cate Soroczan*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2238 0200
STATUS : Ongoing Project

IDENTIFY EXISTING AND EMERGING GREYWATER TREATMENT AND RE-USE TECHNOLOGIES AND TO EXPAND AND REVISE THE TECHSPEX SOFTWARE TO INCLUDE GREYWATER OPTIONS

The objective of this project is to undertake and complete a review of the emerging greywater treatment and re-use technologies and the expansion and review of the TechSpex software to include greywater options.

CMHC Project Officer : *Cate Soroczan*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1927 0200005
STATUS : Ongoing Project
**** NEW ****

IMPROVEMENTS IN ON-SITE WASTEWATER TREATMENT

An innovative on-site wastewater treatment and disposal system was installed and tested on a 2900 sq. metre site, for a single family house in Lunenberg County, Nova Scotia. The system comprised a conventional septic tank and disposal trench, plus a Waterloo Biofilter to pretreat the effluent and reduce some of the burden of treatment from the soil, which is important for marginal or compromised site conditions. Care was taken to practice water conservation via low flow appliances only - i.e. without on-site water reuse which can permit the further downsizing of equipment. However partial recirculation of the treated effluent (after the Waterloo Biofilter) was found to increase nitrogen removal without larger equipment despite cold climate conditions.

CMHC Project Officer : *Chris Ives*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1047 0200001
STATUS : Ongoing Project

LIVING BY WATER GUIDEBOOK

The objective of this project is to prepare, publish, market and distribute a guidebook for waterfront residents on reducing environmental impacts of housing on aquatic and shoreline habitat.

CMHC Project Officer : *Susan Fisher*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2040 0200001
STATUS : Ongoing Project

WATER CONSERVATION, REUSE & MANAGEMENT

ON-SITE STORMWATER MANAGEMENT ALTERNATIVES

This study will provide practical information to municipalities and developers to encourage them to adopt stormwater management alternatives both at the lot and community level. It will examine the costs and benefits of practical solutions as well as the barriers to implementation through a series of case studies.

CMHC Project Officer : *Cate Soroczan*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2087 0200001
STATUS : Ongoing Project

ON-SITE WATER REUSE QUALITY AT QUAYSIDE VILLAGE CO-HOUSING CORPORATION

The water reuse system at Quayside village has been completed. Preliminary testing is under way and the monitoring program should start by Fall '99.

CMHC Project Officer : *Cate Soroczan*
Division : Research Division
AVAILABILITY :
Publication is not available

CIDN : 1991 0200003
STATUS : Ongoing Project

PERFORMANCE ASSESSMENT OF BOOSTER PUMP CONTROLS FOR WATER AND ENERGY CONSERVATION

This pilot study, in partnership with Metro Toronto, Minto, and CMHC will assess the performance of two different booster pump control systems in 6 mult-unit residential buildings. Booster pump performance shall be measured in terms of electrical energy and water savings. The study will assess the impact of booster pump savings on buildings retrofitted with water efficient fixtures to ensure that only the technology application is measured without the influence of other concurrent changes. By utilizing 6 buildings with different characteristics, (size, # of units, occupancy type), the work will also attempt to define what type of building profile will most benefit from utilizing this control system.

CMHC Project Officer : *Cate Soroczan*
Division : Research Division
AVAILABILITY : Publication is not available

STATUS : Planned
**** NEW PROJECT ****

QUAYSIDE VILLAGE GREYWATER DEMONSTRATION PROJECT

A greywater system similar to that of the Toronto Healthy House system is being implemented into a 19 unit cohousing project in North Vancouver, B.C. This system will be capable of treating greywater from sinks, laundry, and showers for reuse in showers, laundry and toilets. Initial testing will be restricted to toilet reuse only. Double plumbing has already been installed and the greywater system is being installed following the signing of a contractual agreement between the city and development regarding ongoing monitoring and maintenance. Upon completion the system will be subject to continuous online water quality monitoring and laboratory analysis to ensure that both the system and the online monitoring is working to satisfaction. The system is now working and monitoring is underway.

CMHC Project Officer : *Cate Soroczan*

CIDN : 1991 0200

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

SUSTAINABLE HOME WATER SYSTEM AT THE ALBERTA SUSTAINABLE HOME/OFFICE

The objectives of the Sustainable Home Water System (SHWS) project were:

- to design an autonomous home water system which includes a rainwater collection, storage, and treatment system; greywater heat recovery; and a greywater treatment and recycling system;
- to install the SHWS at the Alberta Sustainable House as a demonstration prototype;
- to monitor and evaluate the performance of the SHWS and greywater heat exchangers; and
- to determine the SHWS viability in the Canadian housing industry as a retrofit and for new home installations.

The Sustainable Home Water System (SHWS) at the Alberta Sustainable Home/Office reduces total residential water use by 78% compared with average Calgary households.

Collected rainwater is treated on demand to satisfy potable water requirements and meets Canadian Drinking Water Quality Guidelines (1996) for all parameters tested, however aesthetic objectives are slightly exceeded for temperature.

Heat from greywater is reclaimed through the counter current and drum storage greywater heat exchangers contributing 7.4% and 4.4% respectively to hot water heating. In-series operation accounts for 16.8% of the hot water heating required at the ASH home/office.

The greywater is treated using slow sand filters, soil box subirrigation, and a Greywater Garden Wall. The treated greywater conforms to non-potable water guidelines from several US states, apart from the elevated levels of total suspended solids. This reuse water satisfies 86% of the total ASH home/office water demand (i.e. ultra low flush toilet, bathing, clothes washing, and subsurface irrigation).

The Sustainable Home Water System is a cost-effective, environmentally-friendly, safe home water system which can easily be installed in new homes, and SHWS components can be incorporated into existing residential water systems. Maintenance and operation requirements are inexpensive and require limited time, however, a complete understanding of the system is required. Further research, monitoring, and adaptations to the water treatment system will be continued to improve the SHWS.

Prepared by Jorg Ostrowski and Karen Braun, A.C.E. - Alternative & Conservation Energies, Inc. CMHC Project Officer: Stéphanie McFadyen. Ottawa: Canada Mortgage and Housing Corporation, 1998. (Housing Technology Incentives Program)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

WATER QUALITY GUIDELINE AND WATER MONITORING TOOLS FOR RESIDENTIAL WATER REUSE SYSTEMS

This paper discusses the requirements for a monitoring and control protocol for small residential water reuse systems. It reports the findings of a workshop held with key personnel from health and environmental agencies: Onsite Water Reuse in Canada - Ottawa '99 Protocol. The paper identifies and describes various monitoring parameters and control system components which are available and reviews their application in a residential water reuse system. Final draft has been received.

CMHC Project Officer : *Cate Soroczan*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN : 1936 0200001

STATUS : Ongoing Project

WATER CONSERVATION, REUSE & MANAGEMENT

WATER RECYCLING DEMONSTRATION

The goal of this project, was to produce a water recycling unit that is created from off the shelf components. Eight units in Ottawa's Conservation Co-operative are double plumbed for the reuse of treated shower water for toilet use. Analysis of the initial system indicated a number of design flaws. A second system is now up and running and performance monitoring is underway. Initial results indicate that the system is working well and water quality is meeting all requirements.

CMHC Project Officer : *Cate Soroczan*

CIDN : 1573 0200001

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

Y2K

PREPARING YOUR APARTMENT FOR Y2K. ABOUT YOUR HOUSE SERIES; CE 20

This guide has been prepared to provide you with the necessary information to assess the degree to which the Y2K problem could affect your apartment and building. This guide focuses on the appliances, equipment and systems which provide for your health, comfort and security: local utilities, electricity, water, fresh air, electronic access systems and heating. Information regarding consumer goods such as VCRs, camcorders, stereos, televisions, and home computers can be obtained directly from the manufacturer or the store where you bought them.

Ottawa: Canada Mortgage and Housing Corporation, 1999.

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

Y2K

PREPARING YOUR HOME FOR Y2K. ABOUT YOUR HOUSE SERIES; CE 16

This guide has been prepared to provide you with the necessary information to assess the degree to which the Y2K problem could affect your home. This guide focuses on the appliances, equipment and systems which provide for your health and security: loss of electric power, loss of natural gas, loss of water supply, and communications. Information regarding consumer goods such as VCRs, camcorders, stereos, televisions and home computers can be obtained directly from the manufacturer or the store where you bought them.

Ottawa: Canada Mortgage and Housing Corporation, 1999.

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

SOCIO ECONOMIC RESEARCH

ABORIGINAL HOUSING AND COMMUNITY SCENARIOS IN URBAN PRAIRIE CITIES

This research project will explore alternative futures for the housing situation of Aboriginal peoples in selected Prairie cities. The technique to be employed is to construct a number of future scenarios for each location, ready for presentation to a group of key people in each location. A wide range of inputs would be used to construct the scenarios. Three scenarios would be used for each location - each would have a theme or story line and the basic themes would be repeated at each location. While the themes of the scenarios would be common to each location, each scenario would be 'tuned' to account for local circumstance. Inputs would include, for example, demographic trends, local housing market conditions, and community plans and preferences as well as local opportunities.

CMHC Project Officer : *Philip Deacon* **STATUS** : Planned

Division : Research Division

AVAILABILITY : Publication is not available

ADDRESSING SPECIAL HOUSING NEEDS IN FIRST NATION COMMUNITIES

In the 1991 Census, the rate of disability reported by Aboriginal adults was twice as high as that in the Canadian population as a whole. Specifically in the area of housing, the report on the Round Table on Disabilities in First Nations Housing in 1993 referred to a range of problems including a lack of alternative housing, the need to review policies to identify barriers to service provision, and the inappropriateness of prevailing barrier free home designs for Indian reserves.

"Completing the Circle", the Standing Committee report on Aboriginal people with disabilities talked of the need for co-operation and support at the community level if the problems of disabled Aboriginal people are to be addressed. The Department of Indian and Northern Development evaluation of their contribution to the National Strategy for the Integration of Persons with Disabilities found that lack of information is the most significant barrier to First Nations people in finding the help they need.

Using the findings of these initiatives as a framework, as well as the findings of the Home Adaptations for Seniors Independence evaluation, this study profiles specific on-reserve communities in Atlantic Canada, identifying how they are addressing the housing needs of their disabled members, and on the basis of this, developed strategies and mechanisms for such communities to do it effectively.

The report identified recommendations for action by stakeholder groups (Aboriginal organizations in partnership with government) and by individual First Nation communities themselves. It also provided an evaluation of the objectives of the project.

A common element among the recommendations is the need for First Nation disabled people to play a key role in all issues affecting them including: identifying needs, establishing criteria for assistance, making decisions, and being the advocating voice. Another common element is the need for First Nation communities to take a proactive planning approach to meet the special needs of disabled and elderly in their communities, incorporating their needs into the bigger picture of planning for the future of their communities.

ABORIGINAL HOUSING

The "Completing the Circle" report identified that there were major gaps and administrative problems in meeting the needs of disabled Aboriginals. This research confirmed that in Atlantic Canada First Nation communities there are still a number of problems related to these issues. In particular, this research found that there is concern about the inability, real or perceived, to access provincially funded programs to meet on-reserve needs and the uneven provision of basic support services across the communities.

Prepared by: Rural and Small Town Programme. David Bruce, Senior Associate and Tracey Weatherston, with John Higham and Judy Reid. Ottawa: Canada Mortgage and Housing Corporation, 1998.

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

COMMUNICATIONS & INFORMATION TRANSFER STRATEGY FOR ABORIGINAL GROUPS

The goal of this project is to develop a communications and information transfer strategy that will help CMHC in its interactions with Aboriginal housing groups regarding capacity development, research and information transfer activities. To be effective, information has to reach the audience that matters and be in formats that have the maximum impact.

The study looks at the barriers to finding and using housing related information, what makes housing related information relevant, what are key influences, and how effective are the available communications vehicles and distribution channels, all in regard to Aboriginal audiences.

The project consists of: an assessment of existing communication strategies and marketing research in the area of housing information and training; personal or telephone interviews with senior officials of key national and provincial stakeholder groups; group discussions with a broad range of the key client groups as defined in target audiences; and development of alternative communications and information transfer strategies for CMHC and assessment of their relative costs.

The target audience for this project is made up of: key decision makers in housing operations and policies, provincial organizations chosen to give regional coverage, major national organizations, and regional CMHC program officers.

The geographic coverage is Canada wide. All types of Aboriginal community, on or off-reserve in rural, remote and urban communities are included.

CMHC Project Officer : *Philip Deacon*
CIDN : 2225 0200001
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available
**** NEW ****

CORE HOUSING NEED AMONG OFF-RESERVE INUIT, MÉTIS, STATUS AND NON-STATUS INDIANS IN CANADA

This study, based on the 1991 Aboriginal Peoples Survey (APS) and 1991 Census, explores housing need among Inuit, Métis, Status and Non-Status Indian peoples living off-reserve. It profiles the factors that influence the high levels of core housing need experienced by each individual Aboriginal group.

The report brings to light two key conclusions regarding the overall incidence of Aboriginal housing need off-reserve:

- a large proportion of Aboriginal households located in northerly, remote areas of the country occupy housing that is crowded, in need of major repair and lacking adequate bathroom facilities. These physical housing problems are most commonly experienced in Labrador, the northern Prairies and the Northwest Territories; and,

- Aboriginal households are especially likely to fall into core housing need - that is lacking access to housing that is adequate in condition, suitable in size and affordable - in a number of urban areas in Western Canada, most because they are dedicating high proportions of their income to shelter.

Prepared by Ark Research Associates, Ark Research Manager: Aron Spector. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Manager: John Engeland. Ottawa: CMHC, 1998.

*Order Number PE0295 ** Price $12.95 + GST and handling charges.*

STATUS : Completed Report
AVAILABILITY : CMHC Information Products
P.O. Box 35005
Stn BRM B
Toronto, Ontario M7Y 6E5
1-800-668-2642
Fax order from Canada: 1-800-245-9274
International clients see page 9 for order instructions.

ABORIGINAL HOUSING

FEASIBILITY AND VIABILITY OF MANAGING THE POOLED REPLACEMENT RESERVE FUNDS OF FIRST NATIONS AND URBAN NATIVE HOUSING GROUPS

The objective of this project is to research and prepare a report which examines the feasibility and viability of managing the pooled replacement reserve funds of First Nations and Urban Native Housing groups.

CMHC Project Officer : *Tina Heal*
Division : B.C. & Yukon Business Centre
AVAILABILITY : Publication is not available

CIDN : 2084 1500001
STATUS : Ongoing Project

INITIATIVES TO REDUCE THE COST OF DWELLING INSURANCE ON RESERVE

The study is an examination of initiatives to reduce the cost of property insurance on-reserve. It will consider property insurance on band-owned stock, and on houses owned by individuals whether through certificates of possession or other homeownership.

CMHC Project Officer : *Vernon Barkwell*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2144 0200001
STATUS : Ongoing Project
**** NEW ****

RISK MANAGEMENT AND INSURANCE IN ABORIGINAL COMMUNITIES: TWO CASE STUDIES

The cost of insurance is often three times higher in Aboriginal communities than in comparable non-Aboriginal communities. Previous research has shown that less than half of this extra cost can be justified because of the extra risks involved. This report describes two examples of Aboriginal communities who reduced the costs of their insurance through applying a risk management approach and competitive tendering. The 14 Inuit communities of the Kativik Regional Government in Nunavik achieved a decrease of 50% in cost, followed by a further reduction of 20% two years later. The scope of the coverage was improved with the same broker and insurance company as before. The Naskapi Band of Quebec took the same approach. It saved some 70% on the cost of insurance, while improving the quality of its coverage. Here the broker and insurance company changed. Risk management is a continuous and systematic series of activities with three distinct goals: to minimize the likelihood of accidents, to limit their severity, and to ensure that the pre-accident situation can be restored.

Ottawa: Canada Mortgage and Housing Corporation, 1999. 16 pages.

ABORIGINAL HOUSING

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions

STUDY NEW APPROACHES TO ORGANIZATION AND TENURE TO MANAGE FIRST NATIONS HOUSING ACTIVITIES, BOOST PRODUCTION AND IMPROVE MAINTENANCE AND DURABILITY

The purpose of this project is to research and prepare a report which examines new approaches to organization and tenure to manage First Nation housing activities, boost production and improve maintenance and durability.

CMHC Project Officer : *TJ Lee*
Division : Assisted Housing Division
AVAILABILITY : Publication is not available

CIDN : 2192 1500001
STATUS : Planned
*** NEW PROJECT ***

URBAN ABORIGINAL ACCESS TO HOUSING (AND HOMELESSNESS)

This research study will develop a survey instrument to measure the longitudinal profile of Aboriginal household mobility, access to housing and homelessness using a historical interview technique. Snapshot surveys tell us that Aboriginal households are significantly more mobile than non-Aboriginal. This hyper mobility includes not only movement between reserve or home community and urban areas, but also between urban areas and within urban areas. The hyper mobility may lead to frequent difficulties in accessing accommodation, especially when coupled with the low socio-economic status of many Aboriginal households and discriminatory practices of some landlords. Some literature suggest that this combination of circumstances could be a major factor leading to Aboriginal homelessness. About 45% of the Aboriginal population live in cities and this segment of the population is expected to grow by almost half by 2016, which will likely exacerbate the situation.

CMHC Project Officer : *Philip Deacon*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : Plan 7-9018
STATUS : Planned

CANADA MORTGAGE & HOUSING CORPORATION

EVALUATION STUDY OF CMHC'S DIRECTED RESEARCH

The objective of this project is to carry out an evaluation study of CMHC's directed research.

CMHC Project Officer : *Patricia Streich* ***CIDN*** : 2170 0500001
Division : Audit and Program Evaluation Services ***STATUS*** : Ongoing Project
AVAILABILITY : Publication is not available

HISTORY OF THE CMHC'S FIRST FIFTY YEARS: 1946-1996

The purpose of this project is to write a history of CMHC's first fifty years (1946-1996).

CMHC Project Officer : *Eric Tsang* ***CIDN*** : 2113 0600001
Division : Strategic Planning ***STATUS*** : Ongoing Project
Policy & Marketing
AVAILABILITY : Publication is not available

SUMMARY OF THE CORPORATE PLAN, CANADA MORTGAGE AND HOUSING CORPORATION 2000-2004 = RÉSUMÉ DU PLAN D'ENTREPRISE, SOCIÉTÉ CANADIENNE D'HYPOTHÈQUES ET DE LOGEMENT 2000-2004

This Summary of the 2000-2004 Corporate Plan for Canada Mortgage and Housing Corporation (CMHC) and the 2000 annual budget are required by the Financial Administration Act. The Summary briefly profiles CMHC, highlights key achievements for 1999 and discusses external factors affecting CMHC. The Summary also sets out how CMHC plans to meet its four corporate objectives from 2000 to 2004, and how CMHC's activities and their results will make a difference to Canadians. Finally, the Summary presents CMHC's financial plans and the resources it requires to carry out federal housing policy over the next five years.

Ottawa : CMHC = SCHL, 2000.

STATUS : New Completed Report
AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

CHILDREN'S ENVIRONMENTS

ENVIRONMENTAL SCAN: CHILDREN AND POVERTY

This project will involve preparation of an environmental scan or background report on children and poverty, as it relates to housing. This document will include information on demographics, social and economic characteristics, key players, references and potential consultants, as well as housing circumstances for children's housing and living environments.

CMHC Project Officer : *Gloria Neufeld Redekop*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : Plan 7-6683
STATUS : Planned

HOUSING CANADA'S CHILDREN

The intent of this project is to create a comprehensive, objective, insightful and prospective picture of children's' housing conditions and to communicate this picture in clear unambiguous language supported by data.

CMHC Project Officer : *Fanis Grammenos*
Division : Research Division
AVAILABILITY : Publication is not available

STATUS : Ongoing Project
**** NEW PROJECT ****

CITY PLANNING AND HUMAN SETTLEMENTS

BRINGING THE HABITAT AGENDA HOME

The purpose of this project is to publish a book to inform the membership and others in the Canadian Habitat NGO network about the outcome of the Habitat II Conference and the Habitat Agenda, as well as to provide information and ideas in order to facilitate the implementation of the Habitat Agenda.

CMHC Project Officer : *Louis Musto*
Division : Canadian Housing Export Centre
AVAILABILITY : Publication is not available

CIDN : 1965 0900001
STATUS : Ongoing Project

DEMONSTRATION OF FULL-COST ACCOUNTING TOOLS AND TECHNIQUES

The objective of this project is to demonstrate the benefits of using full-cost accounting tools and techniques to evaluate the social, economic and environmental costs and impacts associated with urban growth and to analyse the full costs and impacts of growth in a selected infrastructure in areas of the Fraser Valley Regional District as a case study. The final report will also describe state of the art of assessment methods and tools.

CMHC Project Officer : *Doug Pollard*

CIDN : 2127 0200001

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

GRANVILLE ISLAND: AN URBAN OASIS

Twenty years ago, Granville Island was transformed from a decrepit 37-acre industrial slum in Vancouver's False Creek to possibly the most successful urban redevelopment ever seen in North America. Rusty tin-sided factories were reborn as a public market, an art school, shops, restaurants, theatres, and a great deal more. Today, Granville Island boasts more than eight million visits a year, 2,600 jobs and the highest sales per square foot of any public market on this continent.

This book chronicles the Granville Island story, celebrates what the Island has to offer, and peers inside its seldom-seen inner life. It describes the Island's heritage, its transformation, attractions and amenities and its working life.

Prepared by Michael McCullough. Vancouver : Granville Island Office, Canada Mortgage and Housing Corporation, 1998.

** Price: $39.95 + GST and handling charges.

STATUS : Completed Report

AVAILABILITY : Granville Island Office
Canada Mortgage and Housing Corporation
1661 Duranleau St., 2nd Floor
Vancouver, BC
V6H 3S3
Tel.: 604-666-6655
Fax.: 604-666-7376

LE PROGRAMME ÉCO-QUARTIER DE LA VILLE DE MONTRÉAL: UNE INNOVATION EN ÉVOLUTION

The Éco-quartier program was organized by the City of Montreal to involve its citizens in locally-based environmental initiatives. The purpose of this report is to evaluate the program so that readers from Montreal and all municipalities across Canada can benefit from lessons learned.

This innovative program responds to local environmental needs, most particularly collecting recyclable materials and greening the city. However, it has not addressed large-scale environmental problems such air pollution. In this regard, it has been more focused on issues that directly affect local citizens. Thus the mandate or scope has been somewhat limited.

Regarding its greening the city activities, a horticultural approach has been favoured over an ecological approach, i.e. beautification over biodiversification. Interviews reveal that participation in the activities by citizens has been weak on the design and maintenance of the planted sites, but that local citizens enjoy the initiatives and feel that they fill a social need.

To improve the program, the organizers should involve residents in all phases of the projects, favour use of public spaces over private lots, and make better use of partnerships. They should also expand the program to address other local environmental issues.

Prepared by Gilles Sénécal and Diane Saint-Laurent with the collaboration of Anne-Marie Charlebois and Daniel Léonard. CMHC Project Officer: Susan Fisher. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

COOPERATIVE AND NON-PROFIT HOUSING

BENCHMARKING PHYSICAL PLANT EXPENDITURES IN NON-PROFIT HOUSING

The objective of this project is to assess expenditures and practices related to the physical plant in non-profit housing providers.

CMHC Project Officer : *Duncan Hill*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 2003 0200001
STATUS : Ongoing Project

CRISIS SITUATIONS IN COOPERATIVES: INCREASING UNDERSTANDING TO IMPROVE INTERVENTION

This research project concerns crisis situations in housing cooperatives: the conditions in which they emerge, but especially the dynamics put in place to resolve them.

CMHC Project Officer : *Marie Murphy*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 2018 0200001
STATUS : Ongoing Project

CRIME PREVENTION

SAFE COMMUNITIES: INFORMATION PRODUCTS AND TRAINING MATERIALS

In partnership with the RCMP, CMHC is developing materials to promote the principles of crime prevention through environmental design (CPTED). Priorities were identified at a stakeholder forum held in the Spring of '97. Materials include case studies of success stories at the subdivision and community level, and the enhancement and adaptation of training materials for a variety of distinct audiences, including builders and developers.

CMHC Project Officer : *Mark Holzman*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1938 0200002
STATUS : Ongoing Project

DISCRIMINATION IN HOUSING

HOUSING AND DISCRIMINATION: A REVIEW OF CURRENT KNOWLEDGE

The objective of this research is to identify and examine what knowledge and expertise regarding housing-related discrimination is available in or applicable to Canada.

CMHC Project Officer : *Tom Kerwin*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1792 0200001
STATUS : Ongoing Project

HOUSING AND DISCRIMINATION: THE LEGAL FRAMEWORK

The purpose of this project is to examine housing related discrimination from a legal perspective and to understand how housing-related discrimination fits in Canada's legal framework.

CMHC Project Officer : *Tom Kerwin*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1793 0200001
STATUS : Ongoing Project

HOME OWNERSHIP

CONSUMER EDUCATION & COUNSELING MEASURES USED TO FACILITATE & SUSTAIN ACCESS TO HOME OWNERSHIP

The objectives of this project are to review and assess the nature, scope, operation and results of US consumer education and homeowner post-purchase counseling initiatives aimed at facilitating affordable and sustainable access to homeownership and then to compare this to the current state of affairs in Canada. In the U.S. an increased emphasis has been placed on providing pre-purchase home buyer education and post-purchase counseling in order to mitigate the perceived higher default-risk associated with homeownership loans to lower income households. In recognition of the value of such counseling, HUD offers mortgage insurance premium reductions to households successfully completing such programs. This project will be of interest to organizations involved in facilitating, supporting, and sustaining household's access to homeownership.

CMHC Project Officer : *David Metzak*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2122 0200001
STATUS : Ongoing Project

HOMEOWNER'S MANUAL

The Homeowner's Manual was designed to provide builders with a tool to reduce the time and cost of customer callbacks. Builders can now provide their clients with a Homeowner's Manual filled with practical, easy-to-read information on operation and maintenance customized for their new home.

The Homeowner's Manual is a print-on-demand product to allow for customization. It is divided into three sections covering:

1) customized information based on the particular specifications of the individual home (e.g. type of roofing, foundation ...)

2) generic home care information, seasonal maintenance charts ...

3) a plastic sleeve for inclusion of the New Home Warranty, home plans ...

The Homeowner's Manual is endorsed by the Canadian Home Builder's Association (CHBA) as well as the Canadian New Home Warranty Council (NHWC). Builders who are members of the CHBA or provincial members of the NHWC will have the appropriate association logos printed on the cover of the product.

Builders who purchase this manual for their customers will be providing outstanding customer service, enhancing their professional image and reducing after-sales service costs.

The primary benefit to homeowners is a customized and comprehensive permanent reference tool to help them operate and maintain their new home. It has easy-to-follow text, lots of clear illustrations and environmental, money-saving and health tips.

Ottawa: Canada Mortgage and Housing Corporation, 1999.

Order number: NE2322 **Price: $39.95 + GST and handling charges.

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

HOME OWNERSHIP

METHODS USED ABROAD TO SUPPORT ACCESS TO HOME OWNERSHIP

The objective of this research is to investigate significant and novel mechanisms which other nations have employed, encouraged and/or are considering that support and facilitate access to home ownership in general or to target populations. The intent is to identify new mechanisms that might be implemented in Canada that hold promise to improve access to home ownership. The review will cover the U.S., U.K., Germany, France, Australia and New Zealand. This project will be of interest to the construction and renovation industry, the real estate sales sector, mortgage lenders and insurers as well as federal and provincial housing policy analysts.

CMHC Project Officer : *David Metzak*
CIDN : 1931 0200001
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

STUDY ON THE PREFERENCES OF GENERATION X IN TERMS OF HOUSING

The purpose of this project is to determine the factors that keep the younger generation in rental housing and the ones that attract them to buy; and to conduct seven group discussions: four in Montréal; two in Québec and one in Sherbrooke. The information will be presented at a conference.

CMHC Project Officer : *Jean Laferriere*
CIDN : 2139 1000001
Division : Market Analysis Centre
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

HOMELESSNESS

CITY OF TORONTO RENT BANK PILOT PROJECT EVALUATION: FINAL REPORT

The City of Toronto established a Rent Bank Pilot Project in May, 1998 to help prevent the eviction of mother-led single parents by providing a repayable loan for rental arrears and support services. The City selected a proposal for a partnership among four community agencies in the City's downtown east end (Neighbourhood Information Post, Regent Park Community Health Centre, Central Neighbourhood House and Dixon Hall) to operate the Pilot Project. Initial funding for the project was provided by the City of Toronto and the United Way with the contribution of staff and staff resources by the participating agencies. The evaluation of the Project is funded by Canada Mortgage and Housing Corporation. In January, 1999, the Mayor's Homelessness Action Task Force also recommended that a Rent Bank be established for tenants as an eviction prevention strategy and a way of preventing homelessness.

HOMELESSNESS

The City retained Linda Lapointe and Tim Welch to conduct an evaluation of the Rent Bank Pilot Project. This evaluation and the recommendations developed by the consultants are the result of a six-month evaluation process that began in early 1999. In addition to data obtained on clients from the participating agencies, the consultants also attended several meetings of the Steering Committee, interviewed individuals from agencies on the Steering Committee, landlords, several Rent Bank tenants and representatives of similar programs in other jurisdictions. A mini survey was also conducted by staff on the status of the Rent Bank clients in May, 1999.

The evaluation reviews the characteristics of Rent Bank users, how the loan impacted on their lives and their housing and how the program was administered and delivered. The report concludes with a set of recommendations that will provide assistance to the City as it moves towards an expanded Rent Bank program. For the year 1999, Toronto City Council allocated a fund of $200,000 for this program.

Prepared by Lapointe Consulting and Tim Welch and Associates under the direction of Susan Bacque of the City of Toronto's Shelter, Housing and Support Division. CMHC Project Officer: Anna Lenk. Toronto: The Division, 1999.

STATUS : New Completed Report

AVAILABILITY : Shelter, Housing and Support Division
City of Toronto
7th Floor, Metro Hall
55 John Street
Toronto, Ontario M5V 3C6
Tel: 416-392-1264

DOCUMENTATION OF BEST PRACTICES ADDRESSING HOMELESSNESS

CMHC has documented a cross-section of ten "best practices" projects that have effectively addressed the needs of homeless people and those "at risk" of homelessness. These projects represent a broad range of responses to homelessness and illustrate the diversity of the homeless population throughout the country.

Several criteria were developed to determine which projects to document. It was important that projects demonstrate that homeless persons were involved in developing solutions, that they were empowered to actively pursue the goal of independence, and that safety and security was offered, especially to vulnerable groups such as women, children and youth. Other factors were deemed to be important in denoting effective practices such as:

- Integration of front line service providers in the development of solutions;
- multidimensional approach to meeting needs;
- variety of services to respond to sub-populations; and
- freedom to challenge current beliefs and norms about the nature of the problem.

Six projects were fully documented providing an executive summary, fact sheet, project history, client profile, management and financial profile, and a description of the overall philosophy and approach for each one. Four projects were also documented similarly but in a more condensed form.

Written by Best practice agencies. Coordinated by Luba Serge, Housing Consultant. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Gloria Neufeld Redekop. Ottawa: CMHC, 1999. (Distinct Housing Needs Series)

Note : Aussi disponible en français sous le titre : Documentation des pratiques exemplaires d'intervention auprès des sans-abri.

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

REPORT ON A FEASIBILITY STUDY FOR A PILOT INFORMATION SYSTEM FOR CANADIAN SHELTERS FOR HOMELESS INDIVIDUALS AND FAMILIES

Following a conference on homelessness in June 1995, Canada Mortgage and Housing Corporation (CMHC) initiated a series of projects to test need and demand for a pilot information system for shelters for homeless individuals and families. The intent of the research was to develop such an information system, if needed and feasible. This report represents the second step in this work--a feasibility study on a pilot information system for shelters and an outline of possible information system specifications.

The feasibility study obtained assessments of need for an information system, and views as to how it could work, from organizations operating 62 shelters in cities in all regions of Canada.

The study results indicate that considerable interest exists in a shelter information system (90 per cent of shelters indicated that they felt shelters would benefit from an information system, and 63 per cent indicated that they would consider participation). The feasibility study results suggest that shelter interest in a national information system is substantial, widely based across Canada, and it is feasible to develop a pilot information system for shelters for homeless persons and individuals in Canada. The researchers recommend that such a system be developed, with strong shelter input at each stage as has been the case so far. Such a system would be used by participating shelters, with important uses for planning, advocacy and case management.

Prepared by SPR Associates Inc. CMHC Project Officer: John Engeland. Ottawa: Canada Mortgage and Housing Corporation, 1999. (Distinct Housing Needs Series)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
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International clients see page 9 for order instructions.

ROUNDTABLES ON BEST PRACTICES ADDRESSING HOMELESSNESS: BACKGROUND REPORTS AND SUMMARIES

CMHC co-hosted five regional roundtables in April 1999 and a national roundtable in June 1999 on best practices addressing homelessness, using the "Best Practices Addressing Homelessness: Documentation" as a basis for discussion. The regional roundtables were co-hosted by CMHC and local homelessness organizations. The roundtables were effective opportunities for network building and exchange of information on effective best practices. A final document was prepared containing brief summaries of the six roundtables and "regional backgrounders" on key homelessness issues, prepared by the co-host homelessness organizations.

Ottawa: Canada Mortgage and Housing Corporation, c1999. (Distinct Housing Needs Series)

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
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SERVICES FOR CHILDREN AND YOUTH IN CANADIAN SHELTERS FOR HOMELESS FAMILIES

This project will investigate the availability and viability of space allocations and services for youth and children in emergency family shelters (i.e., family units in homeless shelters, temporary and satellite shelters such as hotels, and shelters for victims of family violence).

CMHC Project Officer : *Gloria Neufeld Redekop*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2085 0200
STATUS : Ongoing Project

WOMEN ON THE ROUGH EDGE: A DECADE OF CHANGE FOR LONG-TERM HOMELESS WOMEN

There have been significant changes over the past decade in the profile of women's homelessness and the service context. The proportion of women who use the emergency shelter system in Toronto increased from 24 to 37 percent from 1988 to 1996. As more women become homeless and the existing social service and health system is less able to assist them, the most vulnerable stay homeless for longer periods.

This report constitutes a retrospective review of the changing patterns of women's homelessness in the Toronto area from 1987 to 1997, with a focus on conditions and services for long-term homeless women, based on the observations and expertise of those who have worked closely with homeless women over the previous decade. Interview data from a small number of homeless women are included, along with a research-based profile of long-term homelessness among women in Toronto.

The report discusses distinctions in shelter and other service use patterns among homeless women (i.e., transitional, episodic, and chronic homelessness) and implications for housing and support service requirements. Women who are homeless for long periods of time face similar circumstances as other homeless women except that their personal resources are fewer, their state of physical and mental health poorer, and their individual capacity to cope is weaker. They are very likely to have severe mental health problems, and it appears that the prevalence of addictions is increasing.

Prepared by Sylvia Novac, Joyce Brown, Gloria Gallant. CMHC Project Officer: Brenda Baxter. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

HOUSE CONSTRUCTION INDUSTRY

HOUSING CONSTRUCTION INDUSTRY: CHALLENGES AND OPPORTUNITIES FOR THE 21st CENTURY

The objective of this study is to examine the evolution of the housing industry in Canada since the mid-1980s, the industry's current and expected future challenges in the period to 2010, and the ways it might and should adapt.

CMHC Project Officer : *Ian Melzer*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1987 0200001
STATUS : Ongoing Project

HOUSING

EXAMINE THE FEASIBILITY OF STUDYING THE CORRELATION BETWEEN ADEQUATE HOUSING AND HEALTH AND EDUCATION

This research proposal will examine the feasibility of studying the correlation between adequate housing and health and education.

CMHC Project Officer : *Line Gullison*
Division : Strategic Planning
Policy & Marketing
AVAILABILITY : Publication is not available

CIDN : 2193 1500001
STATUS : Ongoing Project

FUTURE OF THE INTERNET AND THE HOUSING SECTOR

This study examines the extent of the usage of the Internet in the housing sector. It also briefly explains the Internet and its main features, the history of its general usage, growth worldwide and the opportunities it provides for the housing sector over the next few years. Trends associated with Internet usage are discussed for the following areas of the housing sector: housing construction; the real estate sector, housing financing and evaluation; governments and government agencies; industry associations and urban planning in general. The study provides a useful listing of housing-related Web sites in Canada and the United States in such areas as: institutional and government agencies; construction and architecture; real estate; financing and mortgage loans; planning and related specialties and co-operative housing.

Prepared by Syllable Internet Expressions Inc. Reviewed and supplemented by Florence Millerand. Prepared for Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1999. (Housing Affordability and Finance Series: Research Report)

Order number: PE0317 **Price: $12.95 + GST and handling charges.

STATUS : Completed Report

AVAILABILITY : CMHC Information Products
P.O. Box 35005Stn BRM B
Toronto, Ontario
M7Y 6E5
1-800-668-2642
Fax oders from Canada:1-800-245-9274
International clients see page 9 for order instructions.

HOUSING AND POPULATION HEALTH

This study looks at the links between housing and population health. Population health is a way of conceptualizing and acting on health, by focusing on why some groups in society are more prone to illness than other groups. This study will look at the extent to which housing is or may be a factor. The study will commence with a comprehensive and critical review of the literature. This will be followed by an assessment of the evidence to date and the potential for evidence in the future, with an emphasis on the methodological and measurement issues. The project will conclude with a set of ideas for future research directions.

CMHC Project Officer : *Philip Deacon*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1926 0200001
STATUS : Ongoing Project

HOUSING IN CANADA (HIC) CD-ROM DATA BASE

CMHC is developing an electronic CD data base called Housing In Canada (HIC) which will provide housing interest groups with direct hands-on access to comprehensive data on households and housing conditions using CMHC's custom 1996 housing conditions indicators data derived from the 1996 Census and comparing it with data from the 1991 Census. The data base will enable groups to have the hands-on capability to examine how and why housing conditions are changing.

The bilingual software is to be made available in the form of 39 easily manageable CD-ROM disks; one for each province and territory, and one for each census metropolitan area (CMA). Each provincial/territorial CD-ROM will contain Canada level data on it to provide context for all analyses. Similarly, each CMA CD-ROM will contain two sets of all CMA average data for comparison; one set for the province in which the CMA is located and the other for all of Canada.

CMHC Project Officer : *John Engeland*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2126 0200002
STATUS : Planned
**** NEW PROJECT ****

HOUSING, SOCIAL INEQUALITY AND POPULATION HEALTH

This study is a cross-sectional, survey-based investigation of relationships between housing, social inequality and population health in 13 Vancouver neighbourhood areas. Based on a model of the 'social determinants of health', the research examines relationships between differences in housing suitability, affordability, tenure, type, satisfaction, meaning, and neighbourhood social character on the one hand, and individual health status on the other, while controlling for age, gender, income, and ethnicity differences.

The major objectives are: to investigate ways in which social relations concerning housing and home contribute to the social production of health for individuals and to investigate ways in which housing (esp. affordability) and people's homes could act as a nexus for the production and reproduction of unequal social relations and social inequalities in health status.

CMHC Project Officer : *Philip Deacon*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2144 0200008
STATUS : Ongoing Project

SPECIAL STUDIES ON 1996 CENSUS DATA

This is a series of concise studies that will explore the housing conditions reported in the 1996 Census of Canada. The first study: Research Highlights Issue 55-1 Canadian Housing Conditions is available. It uses data primarily at the national level, explains commonly used terminology, and examines the largest groupings of households. A second study: Research Highlights Issue 55-2 Housing Conditions in Metropolitan Areas is expected to be published in January. Subsequent studies are planned to examine smaller groupings of interest, such as: Aboriginal people; children; families; people who live alone; seniors; tenants; women; immigrants young people.

CMHC Project Officer : *Ian Melzer*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1988 0200003
STATUS : Ongoing Project
**** NEW ****

AFFORDABLE HOUSING SOLUTIONS - FIFTEEN SUCCESSFUL PROJECTS

The project documents innovative approaches and "best practices" for creating affordable housing from the Canadian non-profit and municipal housing sectors. Fifteen case studies highlight several innovative approaches to producing affordable housing including life leases, redevelopment, equity cooperative, co-housing, fundraising and development fund. The case studies describe in detail the attributes of each project and the process that enabled their realization. It is a valuable source of information for affordable housing providers.

CMHC Project Officer : *Fanis Grammenos*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1794 0200002
STATUS : Ongoing Project
**** NEW****

AFFORDABLE, VERSATILE HOUSING

This project identifies and describes house designs that enable a house to accommodate a range of household types, sizes and needs by means of its adaptability. The report documents the features of designs that have been incorporated into built projects and explains their economic and use advantages. The set of designs included covers all housing forms, from single detached houses to multiple-family apartment dwellings. This is the first guide on adaptable designs that lists and classifies the means by which houses can become adaptable.

CMHC Project Officer : *Fanis Grammenos*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1783 0300001
STATUS : Ongoing Project

ALTERNATE TENURE ARRANGEMENTS

The project has two broad objectives: (1) to develop an up-to-date consolidated source of information on the range of alternate tenure arrangements that can be used to implement affordable housing through partnerships; and (2) to assess the extent to which projects utilizing alternate tenure arrangements have successfully met client needs, preferences and expectations. It is intended to be of interest to municipal and provincial officials, and not-for-profit and community groups. Work on the project will include a review of the types of alternate tenure arrangements that exist in Canada, as well as a more focused examination of specific Canadian alternate tenure arrangement projects.

CMHC Project Officer : *David Scherlowski*
Division : Research Division
AVAILABILITY : Publication is not available

STATUS : Ongoing Project

BACKGROUND RESEARCH ON PHILANTHROPIC SUPPORT FOR AFFORDABLE HOUSING

The recent Part IX research project entitled "The Role of Public-Private Partnerships (PPPs) in Producing Affordable Housing: Assessment of the U.S. Experience and Lessons for Canada" noted that philanthropies were a critical participant in the development of the PPP affordable housing system in the U.S. This research project will address the considerable information gap with respect to the role that philanthropic support has played and could potentially play in the provision of affordable housing in Canada. The project will provide organizations involved in either creating or supporting the creation of affordable housing through PPPs with an understanding of the opportunities, as well as alternative ways and means of obtaining financial support from the gamut of potential donor sources in the philanthropic sector. The research is being managed under the direction of an advisory committee that includes members from the Canadian Housing Renewal Association's Board, the CCPPPH National Advisory Committee, a former Director of the Canadian Centre for Philanthropy, CMHC National Office and field staff from the CCPPPH as well as Research Division.

CMHC Project Officer : *David Metzak*
CIDN : 2073 200001
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

BLENDED INCOME HOUSING: LITERATURE REVIEW AND ANALYSIS

The purpose of this project is to provide a summary of the range of housing, social and economic issues and thinking on income blended housing projects. It is a jointly funded CMHC-Revenue Canada initiative with members of both agencies serving as advisory committee members. The final report will be of interest to third sector housing providers and homebuilders as well as municipal and provincial housing officials. The first phase of the project will focus on the development of an analytical framework which will be used in the review of literature on blended income housing. Literature from Canada, the United States, Great Britain and other western industrialized countries will be reviewed in the secondary phase. Findings from the second phase will be analysed so that a comprehensive picture of the range of issues on income blending in housing projects can be presented.

CMHC Project Officer : *David Scherlowski*
CIDN : 1925 0200001
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

HOUSING AFFORDABILITY

COMPENDIUM OF HOUSING AFFORDABILITY STRATEGIES

This project will assemble an electronic database of strategies that have been successfully used to improve housing affordability. These strategies will appear under categories of activity such as: Policy and Regulation; Housing and Community Design; Financing and Tenure; Construction and Technology; Operations and Management; and Redevelopment. Each strategy will be explained and illustrated with two example projects. The database is expected to be accessible through the CMHC web site and be fully searchable and linked to relevant sources of information of the strategies and examples.

CMHC Project Officer : *Fanis Grammenos*

CIDN : 2053 0200004

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

GUIDE TO AFFORDABLE HOUSING PARTNERSHIPS

Today, partnerships have become more and more common in both the private and public sectors as a way of stretching limited resources and achieving strategic objectives. To help you work with other individuals and organizations to address housing needs in your community, Canada Mortgage and Housing Corporation has developed this guide. This guide is intended for individuals and organizations in the non-profit, public and private sectors who have an interest in providing affordable housing for families, single persons, seniors and people with disabilities.

A partnership in housing is an arrangement between two or more parties who agree to work together to achieve shared or complementary housing objectives. Partnerships in housing can be applied at different stages in the life cycle of housing creation - asset creation, maintenance or renewal. They may also be formed to solve housing problems and issues through program and policy development. Partnerships vary in their duration and in their level of formality. Partnerships in housing, except under federal and provincial housing programs, are a relatively new way of delivering housing in Canada. Nevertheless, an impressive number of initiatives have been undertaken or are currently underway. Examples of partnership approaches are given throughout the guide to help you gain a better understanding of the partnership process and how it can be applied to the provision of affordable housing.

Prepared by the consulting team of Linda Lapointe of Lapointe Consulting Inc., Lauren Millier and Greg Spafford of PricewaterhouseCoopers and Luba Serge. Ottawa: Canada Mortgage and Housing Corporation, 1999, c1998.

Order number: NE2216 **Price: $19.95 + GST and handling charges.

STATUS : Completed Report

AVAILABILITY : CMHC Information Products
P.O. Box 35005
Stn BRM B
Toronto, Ontario M7Y 6E5
1-800-668-2642
Fax orders from Canada: 1-800-245-9274
International clients see page 9 for order instructions

HOUSING TRUST FUNDS: THEIR NATURE, APPLICABILITY AND POTENTIAL IN CANADA

This project examines the nature and applicability of housing trust funds and the potential to establish them in Canada for the purpose of funding affordable housing development. A housing trust fund is essentially a locally-based organization that has secured a dedicated source of on-going revenue that is committed to the production and preservation of housing affordable to lower-income households. In the U.S., over a hundred housing trust funds have been established by states, counties and municipalities. They have emerged mainly in response to the declining federal support for affordable housing since the early 1980s. In Canada, although a handful of similar funds have been recently established or are being considered, this approach remains largely unused here. In view of the recent cutbacks in federal funding in this country as well, there is a need to consider and develop corresponding local funding sources for affordable housing.

In addition to the main research report that was prepared, a companion document entitled, A Workbook to Create a Housing Trust Fund in Canada was also produced. It provides guidelines for what needs to be considered in developing a successful housing trust fund. While the experience with housing trust funds is more extensive in the U.S. than Canada, the workbook attempts to access what is instructive from experiences in both countries, and draw upon as well, the emerging interest throughout Canadian cities and provinces. Chapters in the workbook address the following subjects: Getting Ready to Create a Housing Trust Fund; Developing the Housing Trust Fund Proposal; Running a Successful Campaign; and, Sources of Further Information. Both the workbook and main research report are intended to bring housing trust funds to the attention of housing officials as well as affordable housing advocates and developers.

CMHC Project Officer : *David Scherlowski*
Division : Research Division
AVAILABILITY : Publication is not available

STATUS : Ongoing Project
**** NEW PROJECT ****

MARKET ANALYSIS AFFORDABILITY SOFTWARE PROJECT

The objective of this project is to make modifications to Affordability to keep the software current with the latest technology; provide customization for interested clients/partners; create a fully functional Internet version should it be feasible; and provide technical support and expertise to help solve issues and problems that connot be resolved by CMHC's help desk.

CMHC Project Officer : *Greg Goy*
CIDN : 1536 1000002
Division : Canadian Housing Export Centre
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

MUNICIPAL PLANNING FOR AFFORDABLE HOUSING

This project is intended to better inform the housing and planning community of the land use planning and associated financial measures that can be used during the development approval process to bring about new affordable housing. These are: alternative development standards; density bonusing; inclusionary zoning; performance based planning and other flexible planning approaches; linkage programs; and, development cost charges on a unit size basis. A thorough description of each of the six measures will be provided, focusing on their impacts on affordability. The study will also describe some of the potential linkages among them and place them in the larger planning context. The final research report will be of interest to planners, homebuilders, land developers, third sector affordable housing providers and municipal finance officials.

CMHC Project Officer : *David Scherlowski*
CIDN : 2080 0200001
Division : Research Division
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

MUNICIPAL REGULATORY INITIATIVES: PROVIDING FOR AFFORDABLE HOUSING

This report examines three types of regulatory initiatives used by municipalities to provide for affordable housing. These consist of inclusionary zoning, a variety of exaction programs including linkage fees, and density bonusing -- also known as incentive zoning in many places.

All these initiatives rely on the development approval process to encourage, enable or require for-profit developers in some way to provide for housing affordable specifically to lower-income households. While only used to a limited extent in Canada, they have been increasingly used across the United States since cutbacks to federal funding in the early 1980s.

HOUSING AFFORDABILITY

This report is intended to make the opportunities offered by these initiatives more widely known to local housing officials and others involved in the development of affordable housing in Canada

The recent experience with these initiatives in both countries is reviewed, drawing upon both published and municipal reports as well as extensive telephone interviews. The findings are presented mainly through an overview of the three types of initiatives and profiles of two dozen of the most important of representative examples.

Prepared by Richard Drdla Associates Inc. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project officer: David Scherlowski. Ottawa: CMHC, 1999. (Housing Affordability and Finance Series Research Report)

Order number: PE0326 **Price: $12.95 + GST and handling charges.

STATUS : Completed Report

AVAILABILITY : CMHC Information Products

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Toronto, Ontario M7Y 6E5

1-800-668-2642

Fax orders from Canada: 1-800-245-9274

International clients see page 9 for order instructions.

RESEARCH ON AN IMPROVED MEASURE OF AFFORDABILITY FOR ESTIMATING HOUSING NEED IN CANADA

This study was undertaken to assist the Federal/Provincial/Territorial Partners in their review of the standard for housing affordability used in estimating Core Housing Need. Specifically, the report examines whether there is an alternative measure that better approximates housing affordability needs across the country than the current fixed 30-percent Shelter Cost-to-Income Ratio (STIR).

The study was comprised of three major components:

- Examining the fixed 20-percent STIR norm in relation to actual shelter spending patterns;
- Exploring alternative variable-STIR measures which aim to treat households with differing circumstances more equitably than is the case under a fixed STIR; and
- Estimating the number of households in need under the alternative approaches.

Prepared by Clayton Research Associates Limited in association with Fuller Information. Prepared for John Engeland, Research Division, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1997.

(Housing Affordability and Finance Series: Research Report)

*Order No. PE0311 ** Price $12.95 + GST and handling charges.*

STATUS : Completed Report

AVAILABILITY : CMHC Information products
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ROLE OF PUBLIC-PRIVATE PARTNERSHIPS IN PRODUCING AFFORDABLE HOUSING: ASSESSMENT OF THE U.S. EXPERIENCE AND LESSONS FOR CANADA

This report examines how public-private partnerships (PPPs) have emerged in the United States as a delivery vehicle for the provision of affordable housing.

The report first reviews the historical factors and circumstances that bred the PPP system. This evolutionary period is contrasted with the conditions that prevailed in Canada. Part 1 briefly reviews and presents a conceptual framework to describe the range of mechanisms and measures that are used to patch together affordable housing.

Part 2 then introduces and reviews a set of illustrative case studies that were used to examine, in greater detail, how affordable housing projects and partnerships are structured and packaged in the United States. The key features of affordable housing projects and PPPs are highlighted.

Part 3 provides a brief overview of the Canadian context and reviews a smaller set of Canadian case studies. The experience in each country is juxtaposed as a way to help understand the differences that exist and the potential of some of the U.S. approaches to be adapted to fill voids in the Canadian system.

An overall assessment of the U.S. experience and the opportunities to expand the production of affordable housing in Canada through PPPs are the subject of Part 4.

Three detailed appendixes contain, respectively, greater detail on the mechanisms, measures and roles of key partners (Appendix A); profiles of the 15 U.S. case studies (Appendix B); and profiles of the seven Canadian case studies (Appendix C).

Prepared by Steve Pomeroy, Focus Consulting and Greg Lampert, Economic Consultant, in association with James Wallace, Abt Associates, and Robert Sheehan, Regis J. Sheehan and Associates. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Manager: David Metzak. Ottawa: CMHC, 1998. (Housing Affordability and Finance Series Research Report)

Order number: PE0318 ** Price $12.95 + GST and handling charges.

STATUS : Completed Report

AVAILABILITY : CMHC Information Products
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1-800-668-2642
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International clients see page 9 for order instructions.

HOUSING AFFORDABILITY

STATE AND PROVINCIAL AFFORDABLE HOUSING MEASURES

The objective of this project is to identify and describe affordable housing measures being used by various states in the U.S. and provinces in Canada which essentially oblige their municipalities to use the regulations associated with the development approval process, but without financial subsidies, to require or encourage the private sector to provide affordable housing.

CMHC Project Officer : *David Scherlowski*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1670 0200003
STATUS : Ongoing Project
**** NEW ****

HOUSING AND IMMIGRATION

ETHNICITY AND CULTURE IN TENANT PARTICIPATION

This case study looks at possible barriers to community participation that are specifically related to cultural and ethno-racial diversity and suggests strategies that have the potential to enhance participation. The setting for the study is a government assisted housing project in Toronto where the residents include a large number of immigrant families from many different cultural backgrounds.

The study showed that most barriers to participation were linked to: a lack of knowledge about rights in the community, a perception that meetings were not effective and that nothing would be done, feelings of isolation, and lack of confidence especially among newer or smaller groups. However, these factors were not specific to any particular ethnic group and were not directly related to diversity. Some barriers which did have their origins in diversity were also noted.

The study concluded that, by and large, the main barriers resulted from different expectations among the actors (the residents' cultural groups, management, staff and youth) and the way an expectation of any one actor is perceived by the others. There were also many straightforward actions that could be taken that would help close the gaps in expectations, and that these could be combined into five strategic approaches centred on: meetings, information dissemination, relationship building, involvement of cultural groups, and involvement of youth.

CMHC Project Officer : *Philip Deacon*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1195 0100004
STATUS : Ongoing Project

METROPOLIS CENTRES OF EXCELLENCE FOR RESEARCH ON IMMIGRATION ISSUES

CMHC and other federal departments provide ongoing financial support to stimulate and support policy-relevant research on immigration issues, through a network of research centres in Canadian universities. Information on Metropolis and on the almost 200 funded research projects can be found at <canada.metropolis.net>.

CMHC Project Officer : *Tom Kerwin*

Division : Research Division

CIDN : 2224 0200001

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

NEWCOMERS' GUIDE TO CANADIAN HOUSING

This guide is designed to answer newcomers' questions about renting or buying a house. It provides information about housing in Canada, sets out the nature and types of questions to ask landlords, building superintendents, real estate sales representatives, property managers and lenders and explains mortgages, interest, and the steps in buying a house, as well as the process of acquiring rental accommodation.

Ottawa: Canada Mortgage and Housing Corporation, c1999. (Housing Affordability and Finance Series)

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

HOUSING AND TAXATION

LITERATURE REVIEW: TAX INCIDENCE IN THE CANADIAN HOUSING SECTOR

This project has three objectives: (1) to survey current thinking about tax incidence in the housing sector; (2) to determine what this might imply with regard to tax incidence in the Canadian housing sector; and (3) to identify what (if any) additional research would help us better understand the distribution of tax burden in Canadian housing. To achieve these objectives the contractor will summarize major theoretical approaches to tax incidence in housing, delineate a basic theoretical model of tax incidence, summarize relevant empirical literature and determine what can be reliably said about the incidence of taxes currently imposed on Canada's housing sector.

CMHC Project Officer : *Orlando Manti*

CIDN : 1980 0200001

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

HOUSING EXPORT OPPORTUNITIES

ADAPTING CANADIAN HOUSING TECHNOLOGY TO INTERNATIONAL MARKETS: DESIGN, MATERIALS, COMPONENTS AND STRUCTURES

Canada has one of the most diverse and successful housing industries in the world. Operating from this solid base, hundreds of companies with housing-related products, technologies and systems to offer are operating in foreign markets. Many are looking actively for additional export and investment opportunities abroad. To succeed, they pay attention to differences from Canadian norms in national and local standards, cultural traditions, design and quality expectations.

This report answers three main questions: do buyers in foreign housing markets accept what Canadian firms have "off the shelf" at present?; how are Canadian exporters already adapting to specific requirements of foreign customers?; and what future opportunities exist to increase market share by adapting housing-related products, technologies and services?

Based on Statistics Canada export data, many Canadian housing-related materials and products already enjoy widespread acceptance in many foreign markets. Exporters assure buyers of the quality of goods through a variety of means, and also compete effectively on price, availability, and timeliness of delivery. Nevertheless, significant opportunities remain to expand market share through adaptation to local taste, conditions and standards.

HOUSING EXPORT OPPORTUNITIES

Experienced housing exporters are already strongly committed to and acting on the idea of adapting what they sell in foreign markets. They alter design, colour, finishing, quality, performance, dimensions, language of literature or other features, in some cases substantially. However, more needs to be done to facilitate exchanges of practical information on this topic among current and prospective exporters, resulting in significant gains in Canadian export success. Against Canada's very able competitors in international housing markets, every marketing tool that can be created for Canadian firms is needed. Advantages to be gained over other Canadian firms by clutching best practices in many foreign markets are fleeting, if they exist at all. While there are obviously some proprietary technologies and products and commercial-confidential "tricks of the trade", most product and service adaptations are readily evident from published company literature.

The potential market is often so vast that there is plenty of room for everyone from Canada, despite possible perceptions to the contrary.

Foreign private sector partners and government research institutes are increasingly likely to become partners in "co-evolving" a version of Canadian housing technology to meet their own circumstances and needs in future. However, this approach to adaptation must be approached with care, so as to avoid difficulties caused in Japan, for example, where Canada is more noted as a source of quality, competitively-priced lumber, than as a supplier of quality whole-house systems.

Certain Canadian companies focus on products, technologies and services specifically suited to international markets alone, mainly for "low cost" housing. With a few exceptions, the latter appear to be having only modest success at present. The most productive avenue for the future may lie in the direction of investing in local ventures and technology transfer rather than exports as such.

The report concludes with handy lists of key questions for potential use by Canadian companies exploring entry into new international markets or seeking to increase market share. These take the user through an issue-by-issue or element-by-element review of potential adaptation requirements and considerations.

The report also contains contract information for experts in the field, and references for additional reading.

Prepared by C. David Crenna, The Bayswater Consulting Group Inc. CMHC Project Officer: Rob Duncan. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

ASSESSMENT OF PREFABRICATED BUILDING SYSTEMS INDUSTRY

This study will identify the challenges and trends characterizing prefabricated building systems for export, and will determine the capacity development potential for this industry sector.

CMHC Project Officer : *Rob Duncan*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1979 0200002
STATUS : Planned
**** NEW PROJECT ****

BUSINESS GUIDE TO GERMANY FOR THE CANADIAN HOUSING INDUSTRY

The objective of this project is to complete a detailed and accurate guide to Germany for the Canadian housing industry.

CMHC Project Officer : *Louis Musto*
Division : Canadian Housing Export Centre
AVAILABILITY : Publication is not available

CIDN : 1953 0900006
STATUS : Ongoing Project

CANADA'S HOUSING EXPORTERS AND PROSPECTIVE EXPORTERS IN ONTARIO

The purpose of this project is to conduct a study to identify and profile Canada's housing exporters and prospective exporters in Ontario.

CMHC Project Officer : *Leslie Barrett-Sanderson*
Division : Canadian Housing Export Centre
Ontario Business Centre
AVAILABILITY : Publication is not available

CIDN : 2153 0900001
STATUS : Ongoing Project

CANADIAN/JAPANESE CONSTRUCTION COST ANALYSIS OF A TYPICAL 2X4 FRAMED HOUSE PLAN

The purpose of this project is to develop a costing spreadsheet tool for use on all soft and hard costs forming part of the delivered turn key project including at minimum, design; permits and approvals; materials and labour etc.

CMHC Project Officer : *Jay Thakar*
Division : Canadian Housing Export Centre
AVAILABILITY : Publication is not available

CIDN : 1596 0900001
STATUS : Ongoing Project

CHINA HOUSING NEEDS SURVEY

The purpose of this project is to conduct the "China Housing Needs Survey" to determine the current and future housing needs of Canadian companies present in China, and to determine Canadian companies interested in locating staff in Canadian supplied housing.

CMHC Project Officer : *Murray Rasmusson*
Division : Canadian Housing Export Centre
AVAILABILITY : Publication is not available

CIDN :
STATUS : Ongoing Project

CODES AND STANDARDS PROPOSAL TO GERMANY

This project's objective is to develop and implement a strategy and action plan for a proposal to be made to German authorities to improve access to the German housing market for the Canadian housing system.

CMHC Project Officer : *Louis Musto*
Division : Canadian Housing Export Centre
AVAILABILITY : Publication is not available

CIDN : 1809 0900001
STATUS : Ongoing Project

CONTRIBUTION TO A STUDY ON PACIFIC RIM MARKETS FOR TERMITE-RESISTANT WOOD PRODUCTS

The objective of this project is to study the Pacific Rim markets for termite-resistant wood products.

CMHC Project Officer : *Jay Thakar*
Division : Canadian Housing Export Centre
AVAILABILITY : Publication is not available

CIDN : 2104 0900001
STATUS : Ongoing Project

CRITERIA TO HELP FORGE SUCCESSFUL CANADIAN HOUSING ALLIANCES

The purpose of this project is to develop and validate criteria to help determine what makes alliances successful in the housing export market.

CMHC Project Officer : *Louis Musto*
Division : Canadian Housing Export Centre
AVAILABILITY : Publication is not available

CIDN : 1770 0900001
STATUS : Ongoing Project

DEVELOPMENT OF A FRAMEWORK FOR CODES, STANDARDS AND CERTIFICATION FOR THE USE OF CANADIAN HOUSING TECHNOLOGY AND PRODUCTS IN RUSSIA

The purpose of this project is to provide a standard base for family house building development, including row houses, in the cities of the Russian Federation in accordance with the main directions of the 'Zhilische' housing program.

CMHC Project Officer : *Anjela Pavlova*
Division : Canadian Housing Export Centre
AVAILABILITY : Publication is not available

CIDN : 2145 0900001
STATUS : Ongoing Project

DEVELOPMENT OF CURRICULUM MATERIALS FOR TRAINING IN ASPECTS OF MORTGAGE LENDING

The purpose of this project is to prepare curriculum material for a one and a half day training program on components of the residential mortgage lending system in Canada, for international audiences unfamiliar with mortgage lending, etc.

CMHC Project Officer : *Anjelu Pavlova*
Division : Canadian Housing Export Centre
AVAILABILITY : Publication is not available

CIDN : 2261 0900002
STATUS : Ongoing Project
**** NEW PROJECT ****

EARTHQUAKE RESISTANT MODULAR HOME FOUNDATION SYSTEM

While Canadian manufacturers hold a significant share of the Japanese import housing market, they face increasing competition. One response is to introduce improved products which respond to Japanese technical and lifestyle concerns. This report explores such an approach involving improved earthquake resistant foundations which go beyond normal structural 'life-safety' protection to include 'continuing functional livability'.

The original hope had been to reconfigure the typical crawl space foundations to create a sliding slab arrangement whereby modular, panelized or conventional Japanese 2x4 export homes could "float" during an earthquake. However, this proved to be impractical.

The work then considered a variety of alternate strategies before adopting ground isolation utilizing seismic sliders. However, it proved necessary to introduce 200 mm thick pre-cast concrete slabs between the modules and sliders to preclude the light home from moving under Japan's design wind loads. The proposed designs were subjected to computer simulations of the 1994, Northridge; 1995, Kobe; and the 1977 San Fernando quakes. In all instances, the homes met the required earthquake resistance criteria.

Work also considered residential service connections, porches, steps and overhangs such as carport plus a potential closure system at the base of the home. Finally the concept was considered within the context of three-storey, wood-framed apartment buildings.

Costing analysis indicates that an earthquake resistant house foundation is roughly twice the cost of a conventional foundation, but adds only 3% -3.5% to the cost of a typical Japanese home while providing considerably higher protection. More importantly, an earthquake resistant foundation system actually appears less expensive than traditional non-protective foundations for wood-framed apartment buildings.

The work concludes with an analysis of the further research required to conclusively demonstrate the effectiveness of the seismic resistant foundation system in a modular home setting to an acceptable engineering certainty.

Prepared by B. Ian Bazley, Carlos E. Ventura and Jachym Rudolf. CMHC Project Officer: Rob Duncan. Ottawa: Canada Mortgage and Housing Corporation, 2000. (External Research Program)

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

EFFECTIVE INTERNATIONAL MARKETING OF LOW-COST HOUSING TECHNOLOGIES

Canadian based firms have developed a number of significant products, technologies and services relating to both housing and site services which qualify in various ways as "low-cost". Despite the huge demand in theory for low cost housing and site services around the world, relatively few Canadian firms have succeeded in securing large-volume production contracts. In some markets, such as China, India, Bosnia, South Africa and Argentina, there are growing numbers of households who can pay for modest cost housing and want something better than conventional low cost technology typical in their own country. These types of demand create niche opportunities for Canadian companies, either for exports or for technology transfer. A number of low cost housing producers and international agencies responsible for providing low cost housing were interviewed and through this report, provide marketing advice and export entry tips to Canadian low cost housing producers.

CMHC Project Officer : *Rob Duncan*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN : 2144 0200005

STATUS : Ongoing Project

**** NEW ****

ESTABLISHING POLAND REAL ESTATE FUND

The purpose of this project is to assess the feasibility of establishing a Poland Real Estate Fund.

CMHC Project Officer : *Mietka Zieba*
Division : Canadian Housing Export Centre
AVAILABILITY : Publication is not available

CIDN : 2205 0900001
STATUS : Ongoing Project

EVALUATION OF CODES, REGULATIONS, DESIGN & BUILDING METHODS IN PRIORITY MARKETS (USA, RUSSIA, SOUTH KOREA, CHILE)

Canadian exporters of pre-packaged housing and components can compete in off shore markets if they can understand and access their market. Exporters must negotiate foreign markets, regulatory systems and familiarize themselves with local design practices and construction technologies, interpret the local vernacular and housing preferences and then market and distribute their product. The first step in managing these obstacles is to fully understand them so that strategies can be developed to overcome them. Some of this information has already been researched or is in the process of being researched by CMHC and other agencies such as DFAIT, NRCan and NRC. In other cases, especially in emerging markets, little information is available to guide exporters.

CMHC Project Officer : *Rob Duncan*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1949 0200002 (USA)
STATUS : Ongoing Project

EXPORT PERFORMANCE AND NEEDS OF THE CANADIAN MANUFACTURED HOUSING INDUSTRY

The objective of this research is to develop a statistical profile and to identify the export performance and needs of the Canadian manufactured housing industry.

CMHC Project Officer : *Louis Musto*
Division : Canadian Housing Export Centre
AVAILABILITY : Publication is not available

CIDN : 1909 0900001
STATUS : Ongoing Project

HOUSING EXPORT OPPORTUNITIES

FEASIBILITY STUDY ON AFTER-SALES SERVICES AND ESTABLISHMENT OF A WAREHOUSE FOR CANADIAN HOUSING EXPORTS IN JAPAN

The objectives of this project are to identify existing programs for after-sales services; to provide options for after-sales services; to study Japanese laws and regulations governing the establishment of a warehousing facility in Japan by a foreign company; and to do a cost-benefit analysis for the recommended option.

CMHC Project Officer : *Jay Thakar*
Division : Canadian Housing Export Centre
AVAILABILITY : Publication is not available

CIDN : 2056 0900001
STATUS : Ongoing Project

FEASIBILITY STUDY TO BUILD A DEMONSTRATION HOUSE IN THE UNITED KINGDOM

This project's objective is to determine the potential market for Canadian woodframe housing and the feasibility of building a demonstration house in the United Kingdom.

CMHC Project Officer : *Louis Musto*
Division : Canadian Housing Export Centre
AVAILABILITY : Publication is not available

CIDN : 2099 0900001
STATUS : Ongoing Project

GENERAL ASSESSMENT OF HOUSING FINANCE SYSTEMS AND OPPORTUNITIES IN THE MIDDLE EAST

This project's objective is to do a general assessment of housing finance systems and opportunities in the Middle East, and prepare a strategic business development strategy that will enable CMHC to create a network and market its products and services in the Middle East.

CMHC Project Officer : *Louis Musto*
Division : Canadian Housing Export Centre
AVAILABILITY : Publication is not available

CIDN : 2165 0900001
STATUS : Ongoing Project

HOUSING MARKET IN THE UKRAINE AND MARKETABILITY OF WESTERN CANADIAN CONSTRUCTION PRODUCTS IN THE UKRAINE

The purpose of this project is to assess the housing market in the Ukraine and to research the marketability of western Canadian construction products in the Ukraine.

CMHC Project Officer : *Mietka Zieba*
CIDN : 2179 0900001
Division : Canadian Housing Export Centre
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

HOUSING MARKET INTELLIGENCE STUDY OF JAPAN

Japan is one of the world's largest housing markets - housing starts averaged 1.5 million dwelling units annually during 1994-1997 period. This level of annual Japanese housing starts exceeds that of the United States over the same period (1.4 million) and dwarfs the 134,000 average annual starts in Canada.

Much of the market for housing products and services in Japan relates to the construction of single-family housing, which comprises roughly half of the country's total annual housing starts. Many countries including Canada are aggressively targeting Japan as a market for housing-related exports.

Access to market information and research expertise represents an important barrier to Canadian housing firms that are seeking to explore export opportunities in Japan.

This report comprises Phase 1 of a two-phase attempt to assist in this regard. Commissioned by the Canadian Housing Export Centre (CHEC) within Canada Mortgage and Housing Corporation (CMHC), the report highlights the availability, sources and quality of housing market information in Japan. The intent is to inform the Canadian housing industry about how to access important information on the Japanese market.

The Phase 2 study will provide an analysis of prospects for Canadian exports and an analysis of the penetration of imports into this market.

Ottawa: Canadian Housing Export Centre, Canada Mortgage and Housing Corporation, 1999.

STATUS : Completed Report

AVAILABILITY : Available in PDF file on CMHC's Web site. To download this 47 page document visit CMHC's Web site at www.cmhc-schl.gc.ca, click on the Export Opportunities section and browse through the library.

INDIA MARKET STUDY

The objective of this project is to study the market for Canadian housing industry in India, i.e. manufacturers of products related to housing, prefabricated housing, on-site builders and renovators, and professional services.

CMHC Project Officer : *Jay Thakar*
CIDN : 2049 0900001
Division : Canadian Housing Export Centre
STATUS : Ongoing Project
AVAILABILITY : Publication is not available

INTERNATIONALISATION DE LA FILIÈRE HABITATION: UNE ANALYSE PERCEPTUELLE

In the rush of the global trade, an increasing number of Canadians firms are looking to foreign markets, and the housing industry is no exception. As domestic demand is down over previous years, prospecting new markets outside the country, is an avenue firms are increasingly less hesitant to explore. To date, however, the housing industry does not have its rightful share of exports, given its size in the Canadian economy.

This study is primarily a qualitative study based on about forty extensive interviews of corporate executives operating in three sub-sectors of the housing industry: professional construction services (builders, engineers, architects, etc.), manufacturers of building products and manufacturers of pre-fab homes. The interviews were conducted with firms from all corners of Canada. The purpose was not so much to identify the objective export-related difficulties as it was to see how corporate executives perceived these difficulties.

The study's conclusions are the following:

1. Firms generally tend to underestimate the difficulties, constraints and barriers related to international commerce.
2. For business, one of the main challenges in international business is delivering the product and the service within the required timeframes.
3. Corporate executives do not fear market globalization.
4. Few firms are concerned with diversifying their markets.
5. Businesses in the housing sector are not very familiar with the competition in target markets abroad.
6. Building systems which use wood have a harder time penetrating foreign markets.
7. Firms are reserved with respect to government assistance.

Prepared by François Cadotte. CMHC Project Officer: Joanne Hallé. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

HOUSING EXPORT OPPORTUNITIES

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
Canada Mortgage and Housing Corporation
700 Montreal Road
Ottawa, Ontario
K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
International clients see page 9 for order instructions.

INVESTIGATION OF CO-VENTURES AND EXPORT POTENTIAL FOR BUILDING PRODUCTS AND MATERIALS RELATED TO SUSTAINABLE DEVELOPMENT IN CHINA

The purpose of this project is to explore the opportunities that exist in China for co-ventures and the export of Canadian products, technology and materials related to sustainable development to lower the impact on the natural environment and/or promoting a healthy indoor environment.

CMHC Project Officer : Jay Thakar
Division : Canadian Housing Export Centre
AVAILABILITY : Publication is not available

CIDN :
STATUS : Ongoing Project

RESEARCH ON HOUSING EXPORT OPPORTUNITIES IN FRENCH-SPEAKING COUNTRIES AT THE 1999 FRANCOPHONE SUMMIT

The purpose of this project is to undertake and conduct research to determine housing export opportunities in French-speaking countries and at the 1999 Francophone Summit.

CMHC Project Officer : Louis Musto
Division : Canadian Housing Export Centre
AVAILABILITY : Publication is not available

CIDN : 2171 0900001
STATUS : Ongoing Project

RESEARCH ON THE HOUSING MARKET IN SPAIN

The purpose of this project is to prepare a report on the housing market in Spain.

CMHC Project Officer : *Louis Musto*
Division : Canadian Housing Export Centre
AVAILABILITY : Publication is not available

CIDN : 2241 0900001
STATUS : Planned
**** NEW PROJECT ****

RETROFITTING RUSSIA'S HOUSING STOCK: OPPORTUNITIES AND OBSTACLES FOR CANADIAN EXPORTERS

The purpose of this project is to identify several basic business development strategies which could be employed by Canadian firms to practically and realistically respond to the market opportunities represented by the Russian housing sector.

CMHC Project Officer : *Oliver Drerup*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 1830 0200001
STATUS : Ongoing Project

SEMINAR CURRICULUM ON THE CANADIAN HOUSING SYSTEM AND THE ESTABLISHMENT OF AN INTERNATIONAL TRAINING TEAM

The objective of this project is to develop a seminar curriculum on the Canadian housing system to establish an international training team.

CMHC Project Officer : *Louis Musto*
Division : Canadian Housing Export Centre
AVAILABILITY : Publication is not available

CIDN : 1973 0900001
STATUS : Ongoing Project

SERVICE SECTOR EXPORT STRATEGY FOR THE MARITIMES

The purpose of this project is to conduct formal consultations of external clients in the service sector to obtain their views on foreign market development, identify any issues that may be impeding their participation, and provide CMHC with an export strategy for the service sector.

CMHC Project Officer : *Andre Robichaud*
Division : Canadian Housing Export Centre
AVAILABILITY : Publication is not available

CIDN : 2235 0900001
STATUS : Planned
**** NEW PROJECT ****

STUDY OF FACTORY-BUILT HOUSING MARKET OPPORTUNITIES IN SOUTHEASTERN U.S.A..

The purpose of the first of this two-part study was to investigate the potential niche markets open to Canadian manufacturers of factory-built housing in the Southeastern United States. Produced in late 1998, the report provides a substantive examination of the housing markets in Alabama, Georgia, Mississippi, North and South Carolina, and Tennessee. The author of the report states that these specific housing markets were targeted because this particular geographic area is experiencing strong economic growth and that this market is currently a fragmented residential construction market.

Data were collected through research tools such as telephone and personal interviews, analysis of previous research and demographic information on the primary geographic market.

The research reveals there is a growing market for wall panels, as well as timber frame and log homes. A number of US builders interviewed for this project expressed an interest in developing a working relationship with Canadian manufactured housing firms.

Ottawa: Canadian Housing Export Centre, Canada Mortgage and Housing Corporation, 1999.

STATUS : Completed Report

AVAILABILITY : Available in PDF file on CMHC's Web site. To download this 58 page document visit CMHC's Web site at www.cmhc-schl.gc.ca, click on the Export Opportunities section and browse through the library.

STUDY OF THE MIDWEST BUILDING PRODUCTS MARKET IN THE REGIONS OF ILLINOIS, WISCONSIN AND MISSOURI

The purpose of this project is to undertake a study to provide Canadian companies with a general overview of the market forces within the building products sector in the three state regions of Illinois, Wisconsin, and Missouri.

CMHC Project Officer : Louis Musto

Division : Canadian Housing Export Centre

AVAILABILITY : Publication is not available

CIDN : 2172 0900001

STATUS : Ongoing Project

STUDY ON OUTLOOK OF HOUSING MARKETS IN THE UNITED STATES

The objective of this project is to provide Canadian active and potential exporters with the information needed to successfully increase their revenues in the United States.

CMHC Project Officer : *Carol M Kerley*
Division : Canadian Housing Export Centre
AVAILABILITY : Publication is not available

CIDN : 2206 0900001
STATUS : Planned
**** NEW PROJECT ****

STUDY TO DETERMINE THE NEED FOR A PRIVATE SECTOR HOME WARRANTY PROGRAM TO SUPPORT CANADIAN HOUSING EXPORTERS

The purpose of this project is to assess the need for a private sector home warranty program to support Canadian housing exporters.

CMHC Project Officer : *Louis Musto*
Division : Canadian Housing Export Centre
AVAILABILITY : Publication is not available

CIDN : 2243 0900001
STATUS : Planned
**** NEW PROJECT ****

STUDY TO IDENTIFY AND PROFILE CANADA'S HOUSING EXPORTERS AND PROSPECTIVE EXPORTERS IN ATLANTIC CANADA

The purpose of this project is to develop a database of Atlantic Canadian firms in the housing sector involved in or interested in exporting opportunities and to collect descriptive information on the firms identified.

CMHC Project Officer : *Charles MacArthur*
Division : Canadian Housing Export Centre
AVAILABILITY : Publication is not available

CIDN : 2152 0900001
STATUS : Ongoing Project

HOUSING EXPORT OPPORTUNITIES

SURVEY OF CANADIAN HOUSING-RELATED EXPORTERS AND POTENTIAL EXPORTERS

The purpose of this project is to carry out a quantitative study among companies that are either current or potential housing-related exporters.

CMHC Project Officer : *Louis Musto*
Division : Canadian Housing Export Centre
AVAILABILITY : Publication is not available

CIDN : 2175 0900001
STATUS : Ongoing Project

SUSTAINABLE DEVELOPMENT IN CANADA

The objective of this project is to investigate the application of Canadian sustainable development in the Japanese market.

CMHC Project Officer : *Jay Thakar*
Division : Canadian Housing Export Centre
AVAILABILITY : Publication is not available

CIDN : 2092 0900001
STATUS : Ongoing Project

DEMAND PROFILES FOR HIGHER-DENSITY HOUSING

This study examines the relationship between building types as defined by the relative density of projects and household characteristics. It uses the 1991 Census Public Use Micro Data Files (PUMF) to identify the characteristics that distinguish the demand for four types of dwellings:

- the single-family house;
- the duplex, row, semi-attached and attached options that will be referred to as the duplex and townhouse option;
- the under five-storey apartment building; and
- the highrise apartment.

It considers households as formed by couples with children, couples without children, lone parents, and people living alone or with other unrelated people.

The aim is to develop profiles describing the characteristics of households generating the demand for units in higher-density building types and to identify target populations whose entry into the medium-density housing options would contribute most to the goal of making our cities more compact while maintaining a reasonable level of risk in the marketing of units.

The study starts by examining the 1991 census data to describe the households and housing options of Ottawa residents. It links the propensity of the different household types to occupy each of the four buildings types with the Canada Mortgage and Housing Corporation (CMHC) long-run projections of households for the Ottawa region. These projections form a basis for the discussion of how changes in income and housing prices may affect future demand. The role of the existing stock is discussed and a base-line projection developed for the proportion of future housing starts that will be in higher-density buildings. The study concludes by describing household profiles that can serve as targets for the development of new higher-density housing options.

Prepared by Andrejs Skaburskis. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Fanis Grammenos. Ottawa: CMHC, 1999. (Housing Affordability and Finance Series)

Order number: PE0341 **Price: $12.95 + GST and handling charges.

STATUS : Completed Report

AVAILABILITY : CMHC Information Products
P.O. Box 35005
Stn BRM B
Toronto, Ontario M7Y 6E5
1-800-668-2642
Fax orders from Canada: 1-800-245-9274
International clients see page 9 for order instructions

EMPLOYMENT AND HOUSING ACTIVITY: A CYCLICAL ANALYSIS

The objective of this project is to review the economic literature, prepare an estimation strategy, analyze the past cycles of retained employment indicators and estimate the elasticities of housing starts and MLS sales in relation to the employment indicators.

CMHC Project Officer : *Louis Trottier*
Division : Market Analysis Centre
AVAILABILITY : Publication is not available

CIDN : 1952 1000002
STATUS : Ongoing Project

HOME PRICES: LONG-TERM DETERMINANTS AND PROSPECTS

The objective of this project is to examine the following types of questions related to the long-term determinants and prospects for home prices: (1) What does current expert opinion say about long-term price trends in Canada? (2) What does the historical experience of Canadian and other housing markets suggest about future price trends? (3) According to current econometric literature, what factors principally govern long-term movements in home prices? (4) How are these determinants expected to evolve over the next twenty-five years? (5) Is there reason to believe that home prices will fall over the next twenty-five years? (6) How credible is this view in comparison to other scenarios? (7) What are the main weaknesses in our current understanding of long-term price movements?

CMHC Project Officer : *Orlando Manti*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1961 0200001
STATUS : Ongoing Project

HOUSING MARKETS IN BC'S RESOURCE TOWNS: CASE STUDIES FROM THE 1980'S TO THE 1990'S

The purpose of this project is to undertake a detailed study of the housing markets in the following resource towns: Prince George, Prince Rupert, Port Alberni, Trail, Fort St. John and Kelowna, over the period 1976 - 1996, in an effort to model the leads and lags in the local resource economies.

CMHC Project Officer : *Joel Starkes*
Division : Market Analysis Centre
AVAILABILITY : Publication is not available

CIDN : 2072 1000001
STATUS : Ongoing Project

HOUSING MARKET

HOUSING TRANSITION IN SINGLE INDUSTRY 'INSTANT TOWNS'

This research project examines the local housing market in two single industry "instant towns" in Canada with the purpose of tracking transitions within the local housing market as the economic fortunes of the local industry and community changes through time. The research is intended to provide an increased awareness and understanding of these isolated and potentially vulnerable housing markets to public policy makers, resource corporations contemplating such developments, "instant town" communities and their resident households.

CMHC Project Officer : *David Scherlowski*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 2144 0200004
STATUS : Ongoing Project

SEMIOMETERING STUDY

The purpose of the study is to segment the market on the basis of new home buyers and existing home buyers. The segmentation will be done in relation to the values and beliefs of each group.

CMHC Project Officer : *Bruno Duhamel*
Division : Market Analysis Centre
AVAILABILITY : Publication is not available

CIDN : 2188 1000001
STATUS : Ongoing Project

HOUSING SURVEYS

REVIEW OF DATA SOURCES AND INDICATORS

The purpose of this project is to undertake a review of the major national data sources that include housing information which will assist in examining the role each might play in monitoring housing and community trends and developing related indicators.

CMHC Project Officer : *Roger Lewis*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1988 0200001
STATUS : Ongoing Project

ALTERNATIVE METHODS OF FINANCING MUNICIPAL INFRASTRUCTURE

This paper is intended to serve as a backgrounder for two related studies on financing municipal infrastructure:

- Provision of Municipal Infrastructure Through Demand Management: Guidebook and Case Studies
- Public-Private Partnerships in Municipal Infrastructure

In the view of many observers, there has been insufficient, and in some cases inappropriate, investment in Canada's urban infrastructure over the last two decades. Much needed maintenance and repair in existing urban areas are often deferred in favour of infrastructure expansion to new communities on their fringe. The result has been gradually deteriorating facilities in already built-up areas, and a dispersed urban development pattern that is increasingly expensive to service. With other priorities such as health care and education, competing for scarce tax dollars at all levels of government, many municipalities are looking at alternative methods of financing urban infrastructure.

This paper looks at some of the issues surrounding infrastructure finance, including the importance of quality urban infrastructure, the perceived expenditure gap in existing facilities, estimated investment requirements and the efficiency of current development patterns. Based on the assumption that a variety of financing tools are required to supplement government-financed infrastructure, the paper provides an overview of alternative financing mechanisms ranging from development charges and special district financing to user charges and trust funds.

This paper draws on studies presented at a workshop held at the University of Western Ontario in June 1992: Infrastructure and Housing - Challenges and Opportunities. The workshop was co-sponsored by CMHC and the Canadian Home Builder's Association.

Ottawa: Canada Mortgage and Housing Corporation, c1999 (Housing Affordabilty and Finance Series)

Order number: PE0368 **Price: $12.95 + GST and handling charges.

STATUS : New Completed Report

AVAILABILITY : CMHC Information Products
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PROVISION OF MUNICIPAL INFRASTRUCTURE THROUGH DEMAND MANAGEMENT: GUIDEBOOK AND CASE STUDIES

This paper is the second in a series of three Canada Mortgage and Housing Corporation (CMHC) studies looking at infrastructure finance. This paper looks at the ability of demand management (DM) measures to contribute to meeting future water and wastewater infrastructure demands.

Demand management (DM) deviates from traditional water and wastewater system planning by focusing on what causes the demand for water and wastewater services. DM looks at why peaks occur and how to reduce them. The approach focuses on shaping demand, as a precursor to meeting demand.

Part I of this report (the Guidebook) introduces DM, describes DM techniques and identifies how to tailor DM programs to the needs and goals of specific communities. It introduces tools that can be used by planners, engineers and administrators to reduce water use and wastewater flow, including the reduction of systems losses due to leaks and the reduction of wastewater flow due to inflow and infiltration. The Guidebook then discusses the engineering considerations of water and wastewater conveyance and treatment systems which assist in ensuring that public health and the environment are protected. The goal is to provide a balanced perspective of DM considering risks, effectiveness and costs. While DM is not identified as a panacea, it has a role and this role is identified.

Part II of the report (the Case Studies) profiles DM initiatives in the following communities:

- City of Barrie, Ontario;
- City of Edmonton, Alberta;
- Greater Vancouver Regional District, British Columbia;
- Communauté Urbaine de l'Outaouais, Quebec;
- Regional Municipality of Ottawa-Carleton, Ontario;
- Town of Port Elgin, Ontario;
- City of Regina, Saskatchewan;
- Regional Municipality of Waterloo, Ontario; and
- City of Windsor, Ontario.

It is hoped that the Guidebook and Case Studies will encourage readers to further explore DM opportunities for their communities. Resources and references are identified throughout to assist those interested in pursuing this topic.

Prepared by CH2M Gore & Storrie. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: David D'Amour. Ottawa: CMHC, 1999. (Housing Affordability and Finance Series)

Order number: PE0353 ** Price: $12.95 + GST and handling charges.

INFRASTRUCTURE

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PUBLIC-PRIVATE PARTNERSHIPS IN MUNICIPAL INFRASTRUCTURE

Adequate, efficient and well-maintained municipal infrastructure is one of the key components of a viable, prosperous economy, and a significant determinant of quality of life. As competition for scarce resources at all levels of government increases, infrastructure upgrades and expansion are becoming increasingly difficult to finance.

This paper is the third in a series of three CMHC studies looking at infrastructure finance. It explores the potential for public-private partnerships to fund the provision, operation and maintenance of municipal infrastructure. This paper examines the private sector's involvement in urban infrastructure. The study looks at the impacts of public-private partnerships on service costs and quality and examines whether privatization reduces costs to existing and new homeowners. It looks at different partnership models, discusses their strengths and weaknesses and presents a number of case studies, shedding light on which models are most appropriate under which conditions.

Contributing consultants: IBI Group, Dillon Consulting Limited, The Acumen Consulting Group, Lapointe Consulting, Paterson Planning and Research Ltd. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: David D'Amour. Ottawa: CMHC, 1999. (Housing Affordability and Finance Series: Research Report)

Order number: PE0352 ** Price: $12.95 + GST and handling charges.

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AVAILABILITY : CMHC Information Products

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INVESTIGATION INTO THE CAUSES OF RISING MORTGAGE DEBT AND IMPLICATIONS ON THE MORTGAGE MARKET

This study looks at the rising level of mortgage debt in Canada and its implications. The Bank of Canada has noted, with some concern, the rising level of household debt in general and mortgage debt in particular. CMHC has attributed the rise in the latter to mortgages on other than primary residences, and has pointed out that aggregate trends do not take into account the correlation between debts and corresponding assets. By the same token, the National Housing Act (NHA) was changed in 1992 to allow residential mortgages of 95 per cent of the lending value, and first-time owners are allowed to use some of their Registered Retirement Savings Plan (RRSP) funds. These changes should have increased the aggregate demand for mortgage loans. This study extricates the statistical evidence related to growth in mortgage debt and interprets what the trends are indicating.

The study found:

- Despite the rising level of consumer debt, the state of the household balance sheet, on a national accounts basis, is wrong.

- The rising level of consumer debt is principally due to a rising level of mortgage debt, almost exclusively loans by the chartered banks. However, included in the mortgage debt numbers is an unknown quantity, which represents rental properties, cottages, nursing homes, retirement communities and other non-primary residences. A conservative estimate of these portions, taken together, would be approximately one third, in line with the tenure breakdown of the housing stock.

- Despite the use of an estimate of household mortgage indebtedness inflated by mortgages on properties other than principal residences, the mortgage loans outstanding remain well secured by the housing wealth of the country, which continues to rise, albeit at a more modest pace that in previous decades.

- At the household level, using data from the FAMEX from 1982 to 1992, there is no evidence that households have become appreciably more mortgage-indebted over that period. The 1996 survey, when it becomes available, will show the effect of the program-driven, high-ratio mortgages on the overall picture.

- According to industry sources interviewed for this study, credit, is to some extent, supply-enabled, in the sense that the availability of credit and its terms and conditions help shape the debt load assumed by individuals and households.

- There is no evidence of a direct link between high aggregate mortgage debt and the rising level of bankruptcy. Homebuyers who go bankrupt are most likely to be first-time buyers with unresolved debt management issues.

- Finally some portion of the growth in aggregate debt could be expected given the underlying demographics - the baby boom generation has been moving through its peak borrowing years. At this group moves into its saving period, a smaller group will replace it. At the same time, the baby boom generation also stands to inherit a substantial amount of wealth from its prewar parents' generation. The conjuncture of these elements should mean that the high consumer debt will start to decrease.

Prepared by the Corporate Research Group Ltd. in association with Fuller Information and Jacobson Consulting Limited. Ottawa: Canada Mortgage and Housing Corporation, 1999.

STATUS : Completed Report

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LONG TERM TRENDS IN MORTGAGE DEMAND

This study will identify major changes in residential mortgage demand that are likely to occur over the next twenty years. It includes development of an econometric model and the use of it to produce annual estimates over the twenty-year period.

CMHC Project Officer : *Ian Melzer*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2114 0200001
STATUS : Ongoing Project
*** NEW ***

MANAGING THE RISKS ASSOCIATED WITH A REVERSE EQUITY MORTGAGE (REM) LOAN INSURANCE PORTFOLIO

The purpose of this project is to complete a study on the management of risks associated with an insured reverse equity mortgage (REM) portfolio.

CMHC Project Officer : *Brian Davidson*
Division : Policy and Marketing
AVAILABILITY : Publication is not available

CIDN : 1728 0100002
STATUS : Ongoing Project

MORTGAGES AND HOUSING FINANCE

MORTGAGE AND INTEREST RATES MODELING AND FORECASTING

The purpose of this research is to review and evaluate current approaches and practices to modeling and forecasting mortgage and interest rates, and to construct a set of models to provide CMHC with accurate forecasts of these rates.

CMHC Project Officer : *Ali Manouchehri*
Division : Market Analysis Centre
AVAILABILITY : Publication is not available

CIDN : 1858 100001
STATUS : Ongoing Project

PERSONAL FINANCIAL MANAGEMENT FOR HOME OWNERSHIP IN TRANSITIONAL SOCIETIES

The objective of this project is to contribute to the efficiency of the mortgage credit and housing markets of Visegard countries by evaluating the situation which has evolved since 1989 and by making recommendations on what might be done to improve the working of those markets. The project will enable the Canadian housing and financial industries to understand the challenges and opportunities confronting them when dealing with the Visegard markets.

CMHC Project Officer : *Doug Dennis*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 1997 0200001
STATUS : Ongoing Project

PERSONS WITH DISABILITIES

ACCESSIBLE DOWNTOWN RESIDENTIAL COMMUNITIES: A CASE STUDY OF WINNIPEG, MANITOBA

The purpose of this project is to examine housing and community design needs of persons with disabilities, including the elderly, to determine how these needs could be met in a downtown residential location as part of the revitalization of a downtown area.

CMHC Project Officer : *Tom Parker*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 2017 0200001
STATUS : Ongoing Project

EXAMINATION OF THE HOUSING CHOICES OF PERSONS WITH DISABILITIES

To have accurate information on the housing choices of people aged 15 and over with mobility and agility disabilities.

CMHC Project Officer : *Tom Parker*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN : 2144 0200019

STATUS : Planned

EXAMINATION OF THE SUPPORTIVE HOUSING NEEDS OF THE SERIOUSLY MENTALLY ILL IN THE MANITOULIN-SUDBURY DISTRICTS

This External Research study aimed to explore and specify the supportive housing needs, preferences and choices of adults with serious mental illnesses, and in particular to identify similarities and differences among subgroups of this "SMI" population along the lines of geographic location, language/culture, and gender. The study was undertaken in the Manitoulin-Sudbury area of Ontario, where community locales range from urban to rural and remote, and significant proportions of the population are anglophone, francophone and Aboriginal, respectively. One hundred mental health services consumers were interviewed from across the region, plus a cross-section of mental health services providers and representatives of consumer/family support groups. Results indicated that there is a need for supportive housing among all SMI population subgroups regardless of geography, language/culture or gender. The most notable difference among the subgroups was related to geography: consumers living in rural communities outside of the Sudbury district have a higher need for supportive housing because of increased isolation and lack of access to public transportation. Variations by language/culture and gender are also noted in the report although they were not found to be statistically significant in this sample. The report concludes with a series of recommendations to address the identified supportive housing needs.

Prepared by Geneviève Gibbons, David Paquette. CMHC Project Officer: Teresa van den Boogaard. Ottawa: Canada Mortgage and Housing Corporation, 1998. (External Research Program)

STATUS : Completed Report

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PERSONS WITH DISABILITIES

HOUSING NEEDS OF PEOPLE WITH DISABILITIES

The objective of this project is to provide a profile of the housing characteristics and needs of people with disabilities using data from the 1991 Census and post-censal Health and Activity Limitations Survey (HALS).

CMHC Project Officer : *David Metzak* ***CIDN*** : 1045 0200003

Division : Research Division ***STATUS*** : Ongoing Project

AVAILABILITY : Publication is not available

MAJOR MAINTENANCE AND RESIDENTIAL RENOVATION: A SURVEY OF MEANS TO IMPROVE THE ARCHITECTURAL ACCESSIBILITY OF EXISTING BUILDINGS

The objective of this project is to study the extent to which it is possible to integrate architectural accessibility into existing residential buildings during major maintenance or common renovation work planned by an owner.

CMHC Project Officer : *Sophie Bang, Succursale de Montreal* ***CIDN*** : 2021 0200001

Division : External Research Program ***STATUS*** : Ongoing Project

Research Division

AVAILABILITY : Publication is not available

SPACE EFFICIENT UNIVERSAL DESIGN INNOVATIONS

The objective of this project is to evaluate design innovations which have been developed specifically to enhance access for people who use wheelchairs.

CMHC Project Officer : *Tom Parker* ***CIDN*** : 2009 0200001

Division : External Research Program ***STATUS*** : Ongoing Project

Research Division

AVAILABILITY : Publication is not available

PROPERTY MANAGEMENT

CANADIAN RESIDENTIAL PROPERTY MANAGEMENT INDUSTRY PROFILE

The objective of this project was to produce a profile of the residential property management industry containing statistical and descriptive information concerning the size and concentration of the industry, and the roles and responsibilities of key players. It found that the residential property management industry is concentrated in Ontario, followed by Quebec and British Columbia. At the national level, in 1996, the Canadian residential property management industry comprised 13,689 establishments with: revenues of $8.5 billion; profits of $560 million; and employees earning $1.3 billion in salaries and employee benefits. These findings and others are provided at the provincial level as well. This is the only consolidated source of information on the Canadian residential property management industry. It contains previously unavailable statistical information on the economic characteristics of the industry.

Prepared by Mike Ross, Jason Ducharme, Robert Sweeting, Didem Tiryakioglu, of KPMG LLP. Ottawa: Canada Mortgage and Housing Corporation, 1999. (Housing Affordability and Finance Series Research Report)

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RENOVATION AND INSPECTION

DISINVESTMENT AND THE DECLINE OF URBAN NEIGHBOURHOODS

This project aims to develop an understanding of the forces and factors that trigger or accelerate neighbourhood decline; create a consensual framework for action that can stem or reverse the housing decline spiral; ascertain the role of investment in housing as a primer for regeneration; and identify opportunities for concrete action involving partnerships. Three cities that have experienced inner neighbourhood decline will be used as the basis for the analysis.

CMHC Project Officer : *Fanis Grammenos*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN :

STATUS : Ongoing Project

**** NEW ****

HOMEOWNER MOTIVATION AND REVITALIZATION OF OLDER RESIDENTIAL NEIGHBOURHOODS: A STUDY OF INCUMBENT UPGRADING IN WINNIPEG: FINAL REPORT

Recent research in several cities has identified significant upgrading and renovation of homes by residents in stable modest income neighbourhoods. Distinguished from gentrification, which is associated with renovation of homes following the movement of higher income residents into older neighbourhoods, the upgrading in these stable lower income neighbourhoods is known as incumbent upgrading. Urban policy analysts recognize incumbent upgrading as an important process in preventing decline. This study focuses on three Winnipeg neighbourhoods in which incumbent upgrading is identified as the revitalization process. To improve our understanding of this process, a detailed analysis of the characteristics of these neighbourhoods is undertaken and the factors motivating modest income homeowners to upgrade their home and property are explored.

The work suggests that while public investment in improved infrastructure and community services is a motivating factor to spend money on improvements, other factors such as attachment to neighbourhood, perception of crime rates, neighbourhood cohesiveness, participation in neighbourhood organizations and a positive perception of neighbourhood in general may be more important. It follows that fostering this positive perception of neighbourhood may encourage upgrading in modest and lower income neighbourhoods and help prevent decline. The findings suggest that policies which help prevent or address existing systemic problems such as poverty and its numerous associated problems may be more important in fostering this positive perception than public initiatives to improve physical infrastructure.

Prepared by Tom Carter and Christian Douchant (principal investigators). Research assistants: John Hoehn and Maggie Fredrickson. CMHC Project Officer: Fanis Grammenos. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : New Completed Report

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RENTAL REPAIR AND RENOVATION IN CANADA

This report presents analysis and data highlights from the Rental Repair and Renovation Expenditure Survey (RRRES). Statistics Canada conducted the RRRES on behalf of Canada Mortgage and Housing Corporation (CMHC). Clayton Research Associates Limited analyzed the information for presentation in this report.

Since 1988, through the Homeowner Repair and Renovation Expenditure Survey (HRRES), Statistics Canada has provided annual information on repair and renovation work undertaken by homeowners. However, no comparable information was available for rental units. The main objective of the RRRES, therefore, was to fill this information gap by collecting information on the expenditures made by landlords on repairs and renovations to rental units. The survey covered only private rental units; public housing units were excluded. As well, the survey excludes spending by tenants on rental units.

Respondents were asked to report repair and renovation expenditures (both costs of materials, and contracted work) for the following types of work: additions, renovations and alterations; replacement of equipment; new installations; repairs and maintenance. The RRRES also collected information on housekeeping costs.

In addition to an introduction, the report contains two main sections:

- "Highlights" summarizes key survey results from the RRRES.

- "Comparison to Homeowner Repair and Renovation Spending" compares the estimates of spending on private rental units with estimates for the ownership units from the HRRES.

In addition to the main report, the report contains three appendices:

- Appendix A reproduces the Labour Force Survey Contact Information Form, which was used to screen participants, and the Rental Repair and Renovation Expenditure Survey questionnaire.

- Appendix B discusses the survey methodology in more detail.

- Appendix C presents detailed tabulations for figures in the main report. These include data on the incidence of repair and renovation spending and the average spending per unit by type of work, region, structural type of building and period of construction.

Prepared by: Clayton Research Associates Limited. Project Manager: Patricia Arsenault. Prepared for: Canada Mortgage and Housing Corporation. CMHC Project Manager: Roger Lewis. Ottawa: CMHC, 1998. (Housing Affordability and Finance Series Research Report)

Order number: PE0316 **Price: $12.95 + GST and handling charges.

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RENTAL HOUSING

FEASIBILITY OF CREATING A CANADIAN MULTIPLE-UNIT RENTAL HOUSING DATA BASE

This study reviews the feasibility of a data base on multi-family rental housing that would allow investors, developers and builders to obtain current market information on the operating costs and rates of return from alternative buildings. Specifically it examines the demand and potential use for this information, the willingness to pay to access the data, and most importantly, the willingness of industry participants to share information on their property. Clearly, central to such a data base are the procedures used to aggregate information to protect the confidentiality of individual properties. Based on extensive interviews, the study concludes that insufficient interest exists in the housing industry at this time to support this concept. Although respondents reported that they need information on individual urban multifamily markets, most think that costs for such a database would be prohibitive. They also believe that even in large centres, insufficient numbers of properties exist to support useful information once they are aggregated into clusters to protect identities; also, market information from one city is of little use in another. Finally, respondents stated that other issues need to be resolved (e.g. renewing the deteriorated stock) before a database is developed for the multifamily housing market. The results of this research report will be of interest to builders, housing analysts and rental housing investors.

CMHC Project Officer : *David Scherlowski*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2095 0200
STATUS : Ongoing Project

RENTAL HOUSING

HOUSING HELP RENT BANK PILOT PROJECT EVALUATION

This project will document and evaluate the Housing Help Rent Bank pilot project in Toronto which provides mediation, relocation, counselling services and rent loans to women and children who are at risk of eviction from housing which is affordable, permanent and habitable.

CMHC Project Officer : *Anna Lenk*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2091 0200001
STATUS : Ongoing Project

RENTERS AND THEIR HOUSING CONDITIONS: FROM THE 1980s INTO THE 1990s

The purpose of this project is to examine how and why the circumstance of renter households changed over the last fifteen years, with special focus on housing conditions, and the social and economic factors associated with changes in the level and nature of housing need.

CMHC Project Officer : *John Engeland*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1582 0200001
STATUS : Ongoing Project

REVIEW OF METHODS GOVERNMENTS HAVE EMPLOYED TO SUPPORT PRIVATE RENTAL HOUSING

In the current fiscal environment, the federal and provincial governments have limited resources to use in directly supporting the availability of affordable rental housing and must rely on the private sector to achieve this objective. As part of CMHC's efforts to enhance and broaden the understanding of rental housing, this project examines alternative programs and policies employed by governments internationally to support private rental housing, particularly those programs and policies intended to improve the quality, prolong the life or increase the supply of such housing. The review encompassed initiatives from the U.S., U.K., Western Europe, Scandinavian countries, Australia and Japan. This project will be of interest to property developers, private rental landlords and investors, the construction and renovation industry, mortgage lenders and insurers as well as federal and provincial housing policy analysts.

CMHC Project Officer : *David Metzak*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1885 0200001
STATUS : Ongoing Project

UNDERSTANDING PRIVATE RENTAL HOUSING INVESTMENT IN CANADA

The key study objectives were:

- To examine the nature and extent of private rental housing investment in Canada;

- To develop a profile of who is investing in private rental housing; and

- To establish a thorough understanding of what investors and lenders consider in their decision-making process.

The ultimate goal of the research was to provide a solid basis from which public and private sector decision-makers can act in an informed manner.

Rental housing can be divided into two broad sectors:

- Private rental housing refers to units owned by private sector investors; the owner or occupants may have received a government subsidy/incentive at some point, but the units themselves remain in the hands of the private sector.

- Social/assisted rental housing includes any publicly owned rental building, including non-profit and co-op buildings.

It is private rental housing which forms the focus of the current study.

Investment in private rental housing can take a variety of forms, including:

- Developing new "purpose-built" rental properties for own portfolio or for sale to other investors;

- Purchasing rental properties from a previous investor (or developer);

- Holding/owning existing rental properties on an on-going, longer-term basis;

- Converting purpose-built owner-occupied or non-residential space to rental tenure - either temporarily or permanently; and

- Upgrading existing rental properties (i.e. renovation/repair work).

This report covers each of these various types of private rental investment to some degree. However, the emphasis of the analysis, particularly with respect to the development of a profile of rental investors, is on what are termed "active" investors - those who invest in new units, or are purchasing existing units.

RENTAL HOUSING

The study takes a Canada-wide view of private rental investment. Where available, statistical information is presented for the 26 Census Metropolitan Areas (CMAs). In addition, the following 6 major markets have been selected for more in-depth analysis in some instances: Halifax; Montreal; Toronto; Winnipeg; Calgary; Vancouver. These centres were chosen as they are among the largest rental markets, and also provide for a degree of geographic variation.

Prepared by Clayton Research Associates Limited and Fish Marks Jenkins Real Estate Consulting. Ottawa: Canada Mortgage and Housing Corporation, c1999. (Housing Affordability and Finance Series Research Report)

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RESIDENTIAL DEVELOPMENT

ALTERNATIVE PLANNING AND REGULATORY APPROACHES USED IN OTHER COUNTRIES

This study examined international approaches to planning and development regulation through the use of performance based planning. These approaches provide useful lessons and insights in improving the flexibility and effectiveness of the development environment in Canada. In addition to summarizing existing literature on the topic, the research includes the results of interviews with government, development and academic informants in Australia, New Zealand, the United States and Europe.

CMHC Project Officer : *Steve Mennill*

Division : Research Division

AVAILABILITY : Publication is not available

CIDN : 1775 0200001

STATUS : Ongoing Project

COMMUNITY DESIGN: AN ANALYSIS OF DENSITY MEANINGS AND DEVELOPMENT OF A DESIGN TOOL

This research addresses how Land Use Density stipulations can impact and/or interplay with various other system components (such as open space) of community plan-making. It will result in a Sustainable Community Design Tool component that will inform the process of "negotiated urban design" in arriving at midrange density prototypes acceptable to the broad community.

CMHC Project Officer : *Doug Pollard*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 1998 0200001
STATUS : Ongoing Project

CRITICAL SUCCESS FACTORS ENABLING ALTERNATIVE RESIDENTIAL DEVELOPMENT STANDARDS

The purpose of this project is to study innovative examples of the application of alternative development standards. It will determine what the critical success factors are to enable the new standards to be implemented.

CMHC Project Officer : *Doug Pollard*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 2006 020001
STATUS : Ongoing Project

ECONOMIC IMPACT OF ANCILLARY HOUSING EXPENDITURES

This study will estimate economic impacts from ancillary forms of economic activity such as financing, transfer of ownership, land development and servicing. The contractor will provide estimates of direct, indirect and induced impacts on aggregate and sectoral employment and GDP from ancillary expenditures associated with residential construction expenditures, sales of newly-constructed dwellings and sales of existing dwellings.

CMHC Project Officer : *Orlando Manti*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2141 0200001
STATUS : Ongoing Project

EFFECTS OF DEVELOPMENT CHARGES ON URBAN FORM: AN ECONOMETRIC ANALYSIS

This report examines the connections between increasing development charges placed on residential construction and the spread and density of cities. It first reviews the literature on the extent to which increases in development charges increase housing prices and on the estimated coefficients describing the price elasticity of demand for housing.

The empirical work develops multivariate logit models of tenure and building type choice by examining the differences across Canadian cities attributable to differences in the price of housing services relative to consumers' income.

The study concludes that increasing development charges favours the growth of demand for higher-density building types, primarily by keeping a relatively large proportion of households out of the homeownership market. Both homeowners and renters are shown to react to higher price levels by increasing their propensity to move into a row or townhouse rather than a single-family detached house, or to move into an apartment rather than a townhouse. Young people are affected more than older people by increases in development charges.

The report will benefit planners, municipal finance officers and elected officials interested in market-based tools and techniques to influence urban growth and development.

Prepared by Andrejs Skaburskis. CMHC Project Officer: David D'Amour. Ottawa: Canada Mortgage and Housing Corporation, c1999. (Healthy Housing and Communities Series)

Order number: PE0351 **Price: $12.95 + GST and handling charges.

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GROW-AS-YOU-GO: A PROGRESSIVE APPROACH TO HOUSING DEVELOPMENT

This study will elaborate and validate a conceptual approach to progressive, or incremental housing development, in order to facilitate the implementation of a concrete demonstration project. The project will summarize the experience of precedents of growth-housing; do an assessment of the number of low income households that could benefit from this approach; determine what regulations would enable its implementation; apply the concept to sites identified by the City of Toronto; and report on the experience of implementation.

CMHC Project Officer : *Fanis Grammenos*

Division : Research Division

CIDN : 2144 0200013

STATUS : Ongoing Project

AVAILABILITY :
Publication is not available

IMPACT OF SECONDARY SUITES ON MUNICIPAL INFRASTRUCTURE AND SERVICES

The purpose of this research was to investigate and summarize different approaches for determining the municipal servicing costs, both capital and operating, of secondary suites in established neighbourhoods and new subdivisions, through a literature review, resident surveys and key municipal government informant interviews.

Municipalities are increasingly relying on user fees as a way to generate revenue. In BC, there is a growing trend to apply this approach to secondary suites, and municipalities are introducing utility fees and other charges for municipal services for both legal and illegal suites. This is in response to a perception that suites place an additional burden on municipal infrastructure. The rationale provided for these fees is to provide revenue to address the impact of secondary suites on municipal infrastructure and services, and to address community concerns that suites should pay their "fair share" of municipal taxes and costs. However, there is concern about how charges are being calculated and whether they are being assessed equitably. There are also claims that the charges are motivated by municipalities' need to seek additional revenues other than property tax.

This report examines the impact of secondary suites on municipal infrastructure and services. It also assesses the validity of different approaches regarding charges for secondary suites based on a literature review and case studies of three municipalities.

The literature review found no empirical evidence of actual impacts of secondary suites that would justify charging fees. The most commonly held view is that accessory apartments should not place an increased burden on services because they are most likely to occur in areas that have experienced a decline in population and reduced household sizes.

The case studies showed that the impact of secondary suites is likely to vary considerably based on the type of municipality. In urban core municipalities, a minimal impact is likely. Newly developing greenfield outer suburbs may face the greatest impact. In inner suburbs, the impact is unknown. Survey results demonstrated that homes with suites do not consume twice the mount of municipal services as those without. For virtually all aspects of urban infrastructure examined: water and sewer, garbage and recycling, and parking - the occupants of homes with secondary suites consumed less than double the services. Therefore, if municipalities wish to charge for these services on a per unit basis, according to this study, it would appear that the rate for secondary suites should be less than the charge for single family homes.

The authors found that municipalities first need to determine if they wish to charge for suites. The authors recommend that municipalities consider affordable housing policy objectives, administrative issues, and demographic trends in their area. If they wish to charge, they should consider charging based on consumption or based on the type of municipality. The study found the impact of secondary suites on municipal infrastructure to vary in urban core and outer suburban municipalities.

Prepared by Vanessa Geary, Tenant's Right Coalition, Margaret Eberle, and Deborah Kraus. CMHC Project Officer: Steve Mennill. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : New Completed Report

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Ottawa, Ontario K1A 0P7
Tel.: 613-748-2367 or 1-800-668-2642
Fax.: 613-748-4069
Email: chic@cmhc-schl.gc.ca
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INFORMATION REVOLUTION AND RESIDENTIAL DEVELOPMENT

The purpose of this report is to provide a broad overview of the implications of the information revolution for residential development. It identifies the key drivers of change related to the information revolution that impact residential development and describes the state-of-the-art in information and communications technologies in community planning.

CMHC Project Officer : *Susan Fisher*

Division : External Research Program
Research Division

CIDN : 2014 0200001

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

INTENSIFICATION IN URBAN AREAS

This report examines the issue of urban intensification in order to deal with population growth pressures and sprawl. Intensification (also referred to as revitalization or re-urbanization) is a counter-sprawl concept intended to slow the trend toward rampant development of greenfield sites on the urban fringe. Recent studies have found that an intensified development form could result in at least 25% reduction in infrastructure costs and a 40% savings in land consumption. Canadian cities need to encourage mixed-use intensification -- including both new jobs and new housing -- in order to assure efficient public transit, to accommodate changing populations, and to ensure sufficient jobs and population to maintain vibrant urban centres.

Computer visualization is employed in this study to project (in "picture" form) the size, shape, location and appearance of proposed developments and their associated density implications. This technology, which combines geographic information systems and computer-aided design software, is used to illustrate the impacts of intensification on neighbourhoods and the potential visual effects of projects that have not yet been built.

This report demonstrates that:

- Residential and mixed-use intensification is already occurring in some Canadian cities;
- Infill and intensification may be (and have been) effectively employed to increase the stock of affordable housing and to revitalize urban centres; and
- Governments and housing providers must re-think the basis for regulatory controls, rigid building and zoning codes, as well as planning mechanisms which impede the production of low-cost housing;
- Intensification has been achieved by a variety of measures; these include design guidelines in lieu of outdated zoning controls, as-of-right zoning to reduce time delays and processing costs, live/work spaces to promote the provision of both residences and jobs in the city, and the use of density bonuses to encourage concentrated development in key locations (such as transit nodes on major arterials) where revitalization is desirable.

Prepared by Gerald Daly, Richard Milgrom. CMHC Project Officer: Fanis Grammenos. Ottawa: Canada Mortgage and Housing Corporation, 1998. (External Research Program)

STATUS : Completed Report

AVAILABILITY : Canadian Housing Information Centre
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RESIDENTIAL DEVELOPMENT

RESIDENTIAL INTENSIFICATION IN CENTRAL DISTRICTS

The objective of this research is to examine the phenomenon of residential intensification in a dense urban sector using data on the new housing built there in the last five years and on the new residents of those dwellings. The study will focus on the Mile End neighbourhood of Montreal with the view to drawing lessons for the renewal of central districts in other Canadian cities.

CMHC Project Officer : *Mark Holzman*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 2012 0200001
STATUS : Ongoing Project

RESIDENTIAL STREET DESIGN: LEARNING FROM SUBURBIA

The purpose of this research project is to generate concrete residential street design solutions based upon a thorough understanding of precedents, and to introduce and stimulate new ideas for land developers and design professionals.

CMHC Project Officer : *Fanis Grammenos*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 1644 0200001
STATUS : Ongoing Project

ROOFTOP GARDENS

GREENBACKS FROM GREEN ROOFS: FORGING A NEW INDUSTRY IN CANADA

The purpose of this study is to review the benefits of green roofs and vertical gardens, examine barriers to diffusion of technologies in Canada and recommend ways to overcome those barriers.

Green roof and vertical garden technologies offer an outstanding number of public and private benefits including: energy cost savings from increased insulation; increased property values; savings on stormwater infrastructure; air quality improvements; and enhanced aesthetic, health and recreational opportunities.

Barriers to the diffusion of these technologies include: lack of knowledge and awareness; lack of incentives; cost barriers; technical issues; and risks associated with uncertainty. These barriers can be overcome by: compiling a repository of knowledge on the Internet; high profile demonstration projects; government procurement support; government policy and program support; financial incentives such as insurance premium reductions and performance based contracting; and research to address information gaps.

ROOFTOP GARDENS

Prepared by Steven W. Peck, Chris Callaghan, Brad Bass, and Monica E. Kuhn. CMHC Project Officer: Susan Fisher. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : Completed Report

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SENIORS

ADJUSTMENT OF THE ELDERLY TO CONGREGATE CARE HOUSING

This study proposed and tested a model to predict which elderly persons will adjust well to which forms of congregate care housing. Congregate care is defined as multi-unit residential housing for seniors who are physically and mentally healthy, but require some non-medical support services. The study's specific goal was to discover some (a) aspects of congregate care housing that promote positive adjustment for virtually all residents, (b) resident characteristics associated with satisfaction regardless of building, and (c) salubrious combinations of building and resident characteristics associated with positive resident adjustment. The ultimate practical goal, for which this study was a first step, was to develop an assessment device that will predict which persons will better adjust to which forms of congregate care housing.

Prepared by Robert Gifford for Optimal Environments, Inc. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : New Completed Report

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AGING TENANTS IN THE PRIVATE RENTAL MARKET

This report presents the results of a case study analysis undertaken in Vancouver, Victoria, and Winnipeg of privately owned and operated rental buildings occupied by a significant concentration of aging tenants. The focus of the research project was four-fold:

- to conduct a review of the literature focused on aging tenants in the private rental market;
- to assess, via a series of case studies, the willingness and the capability of private landlords in Vancouver, Victoria, and Winnipeg to respond to the needs of their aging tenants;
- to identify and describe initiatives that have been undertaken in the private and public rental sectors across Canada to accommodate the needs of aging tenants;
- and to describe measures that may help landlords address the needs of aging tenants.

Prepared by Kathleen Mancer in association with Donna Kosmuk and Roger Langlais. CMHC Project Officer: Luis Rodriguez. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
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HOUSING FOR OLDER CANADIANS: THE DEFINITIVE GUIDE TO THE OVER-55 MARKET

Canada's older market - 55 and older - is healthier, more active, more informed, more affluent and more demanding than ever before. "Housing for Older Canadians" is the definitive guide for individuals and organizations who want to design, develop, market, manage and sponsor housing for the "over-55" market. Parts of this book will also be useful for support-service providers and for organizations representing older people and who want to help their members find appropriate housing solutions. The guide is tailored to Canadians, and draws on experiences from Canada and other countries, such as the United States.

Ottawa: Canada Mortgage and Housing Corporation, 1999.

Order number: NE2184 **Price: $49.95 + GST and handling charges.

STATUS : Completed Report

AVAILABILITY : CMHC Information Products
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HOUSING OPTIONS FOR PEOPLE WITH DEMENTIA

One disease that can affect older people is dementia. This is a term used for a group of symptoms that affect mental abilities, including: the ability to remember, reason, make decisions, judge and communicate. There are various forms of dementia: the effects of some can be reversed; those of others, currently, cannot. For those people with a progressive type of dementia, specialized care in specialized environments is required to enhance their abilities and quality of life.

This guide sets out to increase public awareness of new housing options for people with dementia and to encourage the development of more community-based solutions. More specifically:

- it describes a range of housing options designed to meet the particular needs of people with dementia;
- it outlines a range of support services that can help caregivers to fulfil their responsibilities;
- it discusses a number of housing management principles that can help in the care of people with dementia; and
- it discusses environmental design considerations for housing people with dementia.

One of the important concepts presented in this guide is that of "residentiality". Very simply, this concerns the importance of creating a home-like setting for those suffering from dementia. The guide discusses two primary options for those suffering from dementia - to remain at home (whether that is a detached suburban bungalow, a condominium apartment or a dwelling unit in a retirement community), or to move into housing specifically designed for people with dementia. For those who can no longer remain at home, the guide presents a number of housing options where persons with dementia can maintain a comfortable sense of living normally.

Ottawa: Canada Mortgage and Housing Corporation, 1999.

*Order number: NE2214 **Price: $24.95 + GST and handling charges.*

STATUS : Completed Report

AVAILABILITY : CMHC Information Products
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IMPORTANCE DU RISQUE ENVIRONNEMENTAL DOMICILIAIRE DANS LA SURVENUE DES CHUTES CHEZ LES PERSONNES ÂGÉES

Research done in recent years has shown that falls by the elderly are not due to chance and are attributable to a combination of factors pertaining to their physical and psychological state, their behaviour and their physical environment. Contrary to intrinsic factors, the environmental component in the risk of falls, though frequently cited as a contributing cause, has been investigated far less. According to studies published in the past twenty years, it has been estimated that the physical environment accounts for close to one half of the falls which occur in the home. The establishment of an environmental risk level pertaining to elders represents a crucial point in preventing falls. In this study, four objectives were pursued:

- List in order the environmental risk factors which relate to falls based on the opinions of a group of experts;
- Determine the level of environmental risk encountered on a daily basis by the elderly living in their homes;
- Identify high-risk sectors in homes;
- Estimate the correlation between the level of environmental risk and the occurrence of falls.

This study examined residents in the Quebec urban region 65 and over, who are autonomous, active and living in their homes. To ensure a homogeneous sample, participants in the study did not require help to move about (walkers and wheelchairs). Two hundred and eleven appointments were scheduled and 192 visits were made between July 21 and October 6, 1997. The information was essentially collected from two measuring instruments completed by interviewers when they visited, i.e., a checklist of environmental risk elements and a questionnaire dealing with the respondent's characteristics (sociodemographic data, whether they have fallen and their history of falling, the level of activity in the home).

Using a linear measuring scale, a group of experts listed in order the various environmental risk factors. This group consisted of 24 persons and covered three specific areas of interest - health, architecture and retired persons. The respondent had to rate each risk factor by choosing a figure on a linear scale to indicate the importance of the factor.

Prepared by Benoît Lévesque, Isabelle Lamontagne, Pierre Maurice, René Verreault, Suzanne Gingras and Denis Gauvin. CMHC Project Officer: Luis Rodriguez. Ottawa: Canada Mortgage and Housing Corporation 1999. (External Research Program)

STATUS : Completed Report

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INTERVENTION MODELS: SAFETY IN CASES OF EMERGENCY OF PERSONS WITH REDUCED MOBILITY AND SENIORS LOSING THEIR INDEPENDENCE LIVING IN REGULAR RESIDENTIAL ENVIRONMENTS

This study is aimed at integrating current knowledge and reflections concerning the problems associated with the safety of seniors and persons with disabilities living in regular residential environments, in order to apply them to the development of intervention models for three multiple-family buildings equipped with elevators.

CMHC Project Officer : *Luis Rodriguez*

Division : External Research Program
Research Division

CIDN : 1460 0200001

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

SENIORS

LIVING AT HOME OR IN A RESIDENCE: A CHALLENGE FOR SENIORS AND WORKERS

The objective of this project is to examine, in Quebec's Saguenay area, the circumstances, constraints, limitations and difficulties encountered by clients who receive home care and the organizations that provide it.

CMHC Project Officer : *Luis Rodriguez*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 1641 0200001
STATUS : Ongoing Project

MEETING SENIORS' HOUSING NEEDS: A GUIDE FOR COMMUNITY GROUPS

The purpose of this guide is to help organizations, such as service clubs, religious organizations, ethnic organizations, neighbourhood groups and retiree organizations, to understand how they can influence the provision of seniors' housing in their communities.

CMHC Project Officer : *Steve Mennill*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1747 0200001
STATUS : Ongoing Project

PREDICTING THE ADJUSTMENT OF ELDERLY PERSONS TO CONGREGATE CARE HOUSING

The objective of this research was to develop a preliminary model for predicting how older people would adjust to congregate housing.

CMHC Project Officer : *Luis Rodriguez*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 1827 0200001
STATUS : Ongoing Project

SENIORS

PRIVATE RENTAL MARKET: ADAPTING TO THE NEEDS OF AGING TENANTS

This research will identify the extent to which landlords in the private rental market across Canada are accommodating the needs of aging tenants, and describe and develop measures that would help landlords deal more effectively with tenant needs.

CMHC Project Officer : *Luis Rodriguez*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 1996 0200001
STATUS : Ongoing Project

STUDY OF SPATIAL ORIENTATION IN A RESIDENTIAL COMPLEX FOR SENIORS WITH OR WITHOUT COGNITIVE DISORDERS

The general purpose of this research project is to obtain spatial orientation design criteria that will make it possible to work on the architectural environment of residential complexes for seniors. The analysis concerns three typical residential complexes.

CMHC Project Officer : *Luis Rodriguez*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2144 0200017
STATUS : Ongoing Project

SUPPORTIVE HOUSING FOR SENIORS

The objective of this project is to undertake research and develop the manuscript of a new CMHC publication on supportive housing for seniors. This housing option is increasingly important to fulfill the demand for housing with on-site or readily accessible support services.

CMHC Project Officer : *Luis Rodriguez*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2103 0200001
STATUS : Ongoing Project

USER SATISFACTION STUDY OF HOUSING OPTIONS FOR OLDER CANADIANS

The objective of this research is to carry out user satisfaction studies of some of the newer housing options that are currently available to older Canadians, and to produce an objective and detailed report based on the results of the research.

CMHC Project Officer : *Luis Rodriguez*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1583 0200001
STATUS : Ongoing Project

EVALUATION OF THE URBAN SOCIAL HOUSING PROGRAMS

The Evaluation of the Urban Social Housing Programs by Canada Mortgage and Housing Corporation (CMHC) covers the Non-profit, Rent Supplement and Urban Native Housing Programs delivered since 1973. These programs were the main elements of the urban social housing strategy introduced by the Federal Government in 1985. The evaluation focused on the programs delivered between 1986 and 1993, but also covered other versions delivered prior to 1986. While new commitments under these programs were terminated in 1993, subsidies continue to be provided to the portfolio of existing projects. Note that the Residential Rehabilitation Assistance Program (RRAP), co-operative housing projects and special purpose housing projects were part of the 1986 urban social housing strategy, but were not included in this evaluation. The Public Housing and Limited Dividend Housing Programs were also not included in this evaluation, nor were any unilateral provincial housing programs.

The evaluation report provide descriptions of the programs and evaluates the success of the following:

- client targeting;- impacts on housing situation, quality of life, social and economic well being;- current housing situation and client satisfaction;- management effectiveness.

Finally, the report comments on the Non-profit and Urban Native Project costs and examines the cost effectiveness of the Non-Profit Program relative to the Rent Supplement Program.

Prepared by: Audit and Evaluation Services, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1999.

STATUS : New Completed Report

AVAILABILITY : Canadian Housing Information Centre
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Ottawa, Ontario K1A 0P7
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CMHC CONTRIBUTION TO THE SUSTAINABLE COMMUNITY DEMONSTRATION IN SURREY, B.C.

This study will document the planning of an innovative, sustainable community in an emerging urban area of Surrey, B.C. It will result in model by-laws and regulatory changes, a best practice guide and quantification of environmental benefits of this alternative neighbourhood compared to a conventional one.

CMHC Project Officer : *Susan Fisher*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2219 0200001
STATUS : Ongoing Project
**** NEW ****

MEASURING STICK: SOCIAL SUSTAINABILITY IN MULTI-UNIT HOUSING

This project will develop indicators that will measure the quality of life as it is affected by features of housing in three different multi-unit urban neighborhoods. These indicators will be then used to design and test a survey instrument aimed at capturing the social and physical attributes of housing as they pertain to sustainable urban communities.

CMHC Project Officer : *David Scherlowski*
Division : External Research Program
Research Division
AVAILABILITY : Publication is not available

CIDN : 2144 0200003
STATUS : Ongoing Project

MULTIPLE HOUSING FOR COMMUNITY SUSTAINABILITY

This project produced information to assist developers and municipalities in developing land at higher than current average densities by means of multiple housing forms. It assembled and developed exemplary multiple housing solutions and assessed consumer demand for these. It also identified market segments and strategies to attract them to medium density housing. The report provides advice on the likely clients for medium density, multiple housing and on project design attributes that will entice them to choose medium density (townhouses and walk up apartments) over single detached housing.

CMHC Project Officer : *Fanis Grammenos*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1628 0300001
STATUS : Ongoing Project

SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

SUSTAINABLE COMMUNITY INDICATORS PROGRAM (SCIP)

Environment Canada and Canada Mortgage and Housing Corporation (CMHC) are developing a Sustainable Community Indicators Program (SCIP) to assist communities in developing and using indicators to measure their progress towards sustainability. The project will entail the development of SCIP's software and WEB site help to communities to enable them to: (1) select, create and use indicators for monitoring and reporting on local sustainability; (2) promote the use of comparable indicators, both locally and at the national level, and (3) exchange indicators and related data with other communities.

CMHC Project Officer : *John Engeland*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 1796 0200002
STATUS : Ongoing Project

YOUR NEXT MOVE: A GUIDE TO SUSTAINABLE COMMUNITY PLANNING

This guide will be aimed at both homeowners and renters planning to move. It will provide a checklist of features that they can look for to identify communities that are affordable, livable, accessible and environmentally sustainable.

CMHC Project Officer : *Susan Fisher*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2158 0200002
STATUS : Planned
**** NEW PROJECT ****

URBAN TRANSPORTATION

DESIGN GUIDELINES FOR REGIONAL ROAD CORRIDORS

The purpose of the study is to develop new guidelines to encourage regional road corridors that are safe and easy to access for pedestrians and that are pleasant places for neighbourhood interaction. These corridors should function as public spaces that link communities and enhance living conditions for households within those communities.

CMHC Project Officer : *Susan Fisher*
Division : Research Division
AVAILABILITY : Publication is not available

CIDN : 2203 0200001
STATUS : Ongoing Project

GREENHOUSE GAS EMISSIONS FROM URBAN TRAVEL: TOOL FOR EVALUATING NEIGHBOURHOOD SUSTAINABILITY

The purpose of this study is to compare the greenhouse gas (GHG) emissions from personal urban transportation given variations in community planning and design variables such as density and land use mix. The final product will be a software tool that would be used by CMHC and its clients to evaluate development proposals for GHG emissions from urban travel. In the study, the software is used to compare the GHGs from urban travel of nine neighbourhood scenarios, each with different design features and locations.

CMHC Project Officer : *Susan Fisher*

CIDN : 2041 0200001

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY : Publication is not available

IMPACT OF URBAN FORM AND TRAVEL ACCESSIBILITY ON PRIVATE VEHICLE USE: SUMMARY

The purpose of this study is to measure the influence of land use patterns and urban form on household travel demand and behaviour. Using household travel survey data from the City of Edmonton, multiple regression analyses were conducted to examine the influence of factors such as: household income and size; accessibility measures by walk, cycle, transit and auto; density and road patterns.

While this study shows that automobile use is largely influenced by factors beyond the 'reach' of planners and engineers, it also indicates that measures that improve walk, transit and bike accessibility and that reduce auto-accessibility can result in substantial reductions in household automobile use. The influence is greatest when these measures are applied in combination.

Prepared by Hunt Analytics Incorporated. Prepared for Research Division, Canada Mortgage and Housing Corporation; Health Canada; Environment Canada. CMHC Project Manager: Susan Fisher. Ottawa: CMHC, 1999. (Healthy Housing and Community Series; Research Report)

Order number: PE0342 ** Price: $12.95 + GST and handling charges.

STATUS : New Completed Report

AVAILABILITY : CMHC Information Products

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CANADIAN WOMEN AND THEIR HOUSING: 1997

The specific objective of this research study is to provide a profile and analysis of women, health and well-being related to housing issues in the 1990s. This report, building on and updating a 1983 report Women as Housing Consumers, is intended to provide information for use by academics, students, researchers, planners and housing policy-makers at municipal, provincial, and federal levels, and women generally. The study is also intended to suggest future directions for research, policy and dialogue with regards to healthy housing for women.

Prepared by: SPR Associates Inc. Prepared for Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1998.(Housing Choices Series.)

Order Number PE0313 ** Price $12.95 + GST and handling charges.

STATUS : Completed Report

AVAILABILITY : CMHC Information Products
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INVESTIGATION OF ISSUES FOR THE EVALUATION OF THE NEXT STEP PROGRAM

The purpose of this project is to conduct a literature review on second-stage housing for the Next Step Program.

CMHC Project Officer : *Patricia Streich*
Division : Audit and Program Evaluation Services
AVAILABILITY : Publication is not available

CIDN : 1507 0500001
STATUS : Ongoing Project

HOUSING CANADA'S YOUTH

The objective of this project is to develop social, economic, and demographic profiles of youth with an in-depth review of their current and past housing conditions, and identification and assessment of housing issues and trends into the future.

CMHC Project Officer : *Gloria Neufeld Redekop*

CIDN : 1786 0200001

Division : Research Division

STATUS : Ongoing Project

AVAILABILITY :
Publication is not available

BIBLIOGRAPHIES

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